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ABSTRACT

Variables expected to be associated with academic achievement were examined in a sample (generally exceeding 2500) from eight secondary schools in Baymon Norte, Puerto Rico. Concern was whether variables associated with academic achievement differed by sex or by socioeconomic status (SES). Multivariate analyses of variance with three factors of achievement, sex, and SES were made. High achievers tended to have accepting mothers, parents low on Hostile Psychological Control, and low on autonomy; and were more geographically mobile, had fewer siblings, were more intelligent, obedient, conscientious, artistic, group-mined, placid, self-disciplined, responsible, anxious (preocupado), mature, and less excitable. High schieving girls were less authoritarian, dogmatic, and test anxious, and gave fewer false but socially desirable responses. Students whose academic achievements were consistent with their SES were more assertive, less bragging, happier, and more esthetically sensitive than those whose achievements were discrepant with their SES. Self concepts were higher for achievers, especially for low SES students in junior high schools, and for all students in high schools. Low achievers, especially boys, disliked school. High achieving boys and low achieving girls were more self sufficient, while low achieving boys and high achieving girls were more group dependent. (Author/RJ)

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DO THE FACTORS AFFECTING ACADEMIC ACHIEVEMENT DIFFER BY THE SOCIO-ECONOMIC STATUS OR SEX OF THE STUDENT?

A Puerto Rican Secondary School Sample

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Variables expected to be associated with academic achievement were examined in a sample (N generally exceeding 2500) from eight secondarys schools in Bayamón Norte, Puerto Rico. Concern was whether variables associated with academic achievement differed by sex or by socio-economic status. Multivariate analyses of variance with three factors of achievement, sex, and SES were done. High achievers tended to have Accepting mothers, parents low on Hostile Psychological Control, and low on Autonomy, were more geographically mobile, had fewer siblings, were more intelligent, obedient, conscientious, artistic, group-minded, placid, self-disciplined, responsible, anxious (preocupado), mature and were less excitable. High achieving girls were less Authoritarian, Dogmatic, Test Anxious and gave fewer false but socially desirable responses. Students whose academic achievements were consistent with their SES were more assertive, less bragging, happier and more esthetically sensitive than those whose achievements were discrepant with their SES. Self-concepts were higher for achievers, especially for low SES students in junior highs and for all students in high schools. Low achievers, especially boys, disliked school. High achieving boys and low achieving girls were more self-sufficient while low achieving boys and high achieving girls were more group dependent.

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INTRODUCTION

This research program dealt with factors which were considered to be relevant to academic achievement. The specific research focus was on whether those factors distinguishing high achieving students from low achieving students differed by the social status or sex of the students involved. The entire population involved in this study were Puerto Rican students attending school in the Bayamón Norte school district in Puerto Rico.

The last six years have witnessed increasing interest in underpriviliged groups and the factors which affect their school performance (Deutsch, Katz, & Jensen, 1968; Rubel, 1966, Coleman et al., 1966; Bloom, Davis, & Hess, 1965; Jensen, 1969; Riessman, 1962; Herriot and St. John Hoyt, 1966). The bulk of this research has concentrated on the Negro population. Less emphasis has been placed on understanding the factors affecting academic performance among Puerto Rican children.

The Coleman Report (Equality of Educational Opportunity, Coleman et al., 1966) obtained data on Puerto Ricans and their educational opportunities and achievements. They found that Puerto Ricans suffered from many of the same ills as the Negro population, but that their achievement scores were even lower. Using achievement test data, Coleman and his associates found that Puerto Ricans, as found earlier with other minorities from linguistic subcultures, were especially disadvantaged in language dependent areas such as reading comprehension and verbal ability. Of all the minority groups, Puerto Ricans felt the least sense of control over their environment. Puerto Rican children were also the group whose performance was most affected by the quality of the school facilities and teacher characteristics. Informative as the Equality of Educational Opportunity report is, it did not study in great depth the complexity of the factors underlying the academic performance of Puerto Rican children.

A study of the educational opportunities of the different social classes in Puerto Rico has been conducted by Sussman (1969). Using questionnaires she found that the rate of attendance in the twelfth grade for Puerto Rican urban youths from upper, from middle, and from working class homes were nearly equal even though only a third of each social class group were enrolled at that time. Thus in Puerto Rico working class students were attending and graduating from high school at about the same rate as middle and upper class students when there were not enough schools and places for all of the higher social class students who wanted to attend to do so. This democratization of access was accompanied by increasing segregation of the socially advantaged and disadvantaged into private and public schools respectively. Although Sussman was concerned with social class and its effects on school attendance, she did not study the factors which contribute to the educational performance of the students from various social status levels.

The literature on the effect of social class on educational achievement is substantial (Dave, 1963; Deutsch, 1965; Havighurst and Davis, 1955; White, 1957; and Wolf, 1964). In general the higher the socio-economic position of the family, the greater the likelihood of the student achieving well academically. However, beyond the link between social class and inherited intelligence, the dynamics of the social class effect have not been extensively explored until the work of Wolf (1964) and of Dave (1963). Dave found the following six home environment variables as most relevant to educational achievement:

1. Achievement press
2. Language models in the home
3. Academic guidance provided in the home
4. Stimulation provided in the home to explore various aspects of the larger environment
5. Intellectual interests and activity in the home
6. Work habits emphasized in the home.

Davidson and Greenberg (1967), focusing on high and low achievers among Negro urban 5th graders, found that the most powerful discriminating factors were related to self image and cognitive-ego efficiency. Parental concern was also related while factors of motivation and productivity and positive expressed attitudes were not significantly related.

Numerous past studies have found academic achievement to be higher among females than among males. The reasons why females tend to obtain somewhat better grades on the average may be rooted in the nature of sex roles in Western society and the types of values associated with these sex roles. Thus the male, especially in a Latin American machismo-oriented culture, is expected to be strong, active, energetic, dominant, brave, while the female is expected to be weak, passive, submissive, and more concerned with the intellectual-emotional aspects of life. Nuttall (1969) found that Puerto Rican girls were significantly more Tender-Minded and more Obedient than Puerto Rican boys. These two personality factors were also related to academic achievement among both boys and girls with those students who were more Obedient and more Tender-Minded being the better students.

Of major importance in understanding student achievement in the school context are measures of how the student perceives and evaluates the place of education in general and school in particular with respect to his own life. There is clear theoretical justification for the importance of these perception and evaluation factors both in terms of general behavior theory and in terms of previous educational research. Social action theory (Parsons, 1936), certain learning theory (Miller and Dollard, 1941), social exchange theory (Blau, 1964; Homans, 1961), game theory (Rapaport, 1960), and various other major theories of human behavior all support the importance of "need-values" or "goal dispositions" together with "probability expectancies" in determining behavior, whether academic achievement or whatever.

Similarly studies by Neidt and Merrill (1951) and by Tumin and Feldman (1956) have shown that student attitudes toward education are quite significantly related to academic achievement.

Previous research by Nuttall et al (1968) on a population of Puerto Rican secondary school students have indicated that roughly six-tenths of the variability of student grade point average academic achievement could be predicted. One-tenth could be attributed to socio-economic and parent-child relationships; one tenth to intelligence; one tenth to the future plans of the students and two-tenths to student's personality traits.

Building on the previous work a set of specific hypotheses were set up to be tested in this study. These hypotheses are detailed below.

A. Home and Family Factors

1. High achievers of low socio-economic status of both sexes would tend to:

   a. have a father present in the home.
   b. have more rooms in their homes
   c. have fewer siblings
   d. have families which have been more geographically mobile.
   e. have relatively better educated parents.

   High socio-economic high achievers should also tend to have the above characteristics but it is expected that the difference between high and low achievers of high socio-economic status will be less on these characteristics than will the difference on these characteristics among low SES students.

2. Regardless of socio-economic status or sex, high achievers will tend to describe their parents as high on Acceptance, high on Psychological Control, and low on Autonomy using Schaefer's (1965) Children's Report of Parental Behavior Inventory.

B. Personality Factors

1. On Cattell's High School Personality Questionnaire instrument high achievers of all SES levels and sexes should be more Intelligent (Factor B), Conscientious (G), Tender-Minded (I), Controlled (Q3), Placid (low on Factor O), Groupminded (low J), and more Emotionally Stable (C).

2. On the Peer Personality Rating Scales, (Smith, 1967) the high achievers irregardless of sex and socio-economic status should be seen as more persistent, more orderly, and more submissive than the low achieving student.

3. The high achievers of all SES levels and of both sexes should be less Authoritarian using Adorno et al's (1950) California F-Scale of Authoritarianism, should be less Dogmatic using Rokeach's (1960) Dogmatism Scale, should have lower scores on Sarason's (1960) Test Anxiety Scale, and finally should score lower on Crandall et al's (1965) Children's Social Desirability Scale.

C. Educational Plans

Regarding educational plans, high achievers of both sexes would tend to:

a. aspire to occupations of a higher level
b. aspire to obtain a college education
c. be willing to defer marriage in favor of further education.

High achievers from low socio-economic status backgrounds should show especially strong effects here. Low achievers from high SES backgrounds will tend to have fairly high aspirations while low achievers from low SES backgrounds will not.

D. Self Concept

The high achieving student should be more likely to feel that he is among the most intelligent or above average in intelligence among his classmates. The self-concept of the high achiever from a low SES background should be considerably higher than the self-concept of the low achiever from a low SES background.

E. Peers

The high achieving student should have more friends in school, and belong to more clubs and organizations (other than athletic teams or clubs). This should be true for both sexes and at all socio-economic status levels.

F. Study Habits

The high achieving student, regardless of sex and SES should report more hours spent on homework each week. Girls should in general report more homework than do boys.

G. Attitudes Toward School

The high achieving students, especially from a low socio-economic level, should have a more positive attitude toward school, and be less interested in quitting school and going to work.

These hypotheses were tested in the present study by examining differences among students according to their academic achievement, their sex, and their socio-economic status. Two levels of achievement were used, two sexes, and five levels of SES yielding a 2x2x5 design. The analysis of variance and the multivariate analysis of variance were the major tools of analysis, with some analysis of covariance and multivariate analysis of covariance.

To examine the question of possible differences in the factors affecting academic achievement for low socio-economic background students the achievement by SES interactions were particularly important. For testing the possible differences in factors affecting achievement for boys as compared with girls, the achievement by sex interactions were important. The triple interactions of achievement by sex by socio-economic status would be significant when the factors affecting achievement differed both by sex and socio-economic background.

METHODOLOGY

In the Spring of 1968 the Office of Research and Educational Development of the Department of Public Instruction, Commonwealth of Puerto Rico undertook a large scale effort to examine factors which might affect student achievement. Those aspects of the study which involved the development and use of social and psychological measures were under the scientific direction of a team from Boston College led by Dr. Ronald L. Nuttall. The main purpose of the study was the development and testing of instruments and procedures for a later longitudinal study of the school system in Puerto Rico. It was hoped that in this longitudinal study students would be monitored periodically and their progress noted and related to school curriculum and to school organization variables.

An extensive bibliographical search during the period from January 1967 to August 1967 resulted in a recommended set of instruments. This set of instruments was designed to measure aspects of the student's family background, his living conditions, the ways his parents raised him, his study habits, his general personality, his attitudes toward school, toward work, and his plans for his future life. A special focus was given to measures of the peer group of the student and one instrument used the peer group to judge and measure the general personality of the student. A total of some seventeen instruments were developed, some of which covered a wide variety of material. There were alternate forms for junior high and for senior high on the instruments dealing with future plans and with Test Anxiety.

Because of a concern with peer groups and an interest in possible linking of data from students with data from teachers it was decided to study a complete school district rather than sample students from across the island. Considerations of time and cost indicated one school district rather than several scattered around the island. These decisions restrict the generalizability of the findings since the island school system as a whole was not sampled and cannot be seen as the population from which a random sample was drawn.

The district selected was that of Bayamón Norte. This district was selected after consultations with several people in the Department of Public Instruction. Factors taken into account in this selection were nearness to our offices in Hato Rey, the presence in the district of some sections of rural area, some sections of urban slum, and some sections of newer suburban developments. A large factor also was the interest and cooperation of the superintendent of the district. The final decision on the district to be selected was made by the Department.

This study was designed for secondary school students, that is, grades seven through twelve. In the Bayamón Norte school district there are six public and three private secondary schools. One of the public schools had only grades ten through twelve and another had grades seven through twelve. Four of the public schools had only grades seven through nine. One private school had only boys but for grades seven through twelve. One private school was for girls only for grades seven through nine, the other was a girls only school for grades ten through twelve.

There were 6,712 students enrolled in these nine schools according to the records at the time of the study. Some 3,152 of these were in grades ten through twelve and 3,560 were in grades seven to nine. For the seventeen instruments used for students in this study the average completion rate was 79.2 per cent of the enrolled students. This rate varied from one instrument to another from a low of 64.5 per cent of the target population to a high of 94.2 per cent. Loss of students was due to students being absent on one or more days of the administration. Some students had in fact transferred out of the district or had dropped out of school while their school records had not yet recorded this. All students were given the option of not answering any given question or any questionnaire, however very few took advantage of this option.

The teacher given grades for the school year 1967-68 were photocopied from the school records. The grade point averages were the achievement data used in the present study. Those students whose grade point averages were B- or higher were considered to be "High Achievers", while those whose grade point averages were C+ or lower were considered to be "Low Achievers". Grades were not made available for the private boys' school and so these students were omitted from this analysis.

Socio-economic status was developed by averaging four Z scored variables: Father's occupational status, Father's educational level, Mother's occupational status, and Mother's educational level. Where one or more of these variables was missing, for example when the child came from a one-parent family, the socio-economic status was calculated from the mean of the Z scores of the remaining variables. If the mother had no occupation other than housewife, the socio-economic status was calculated from the remaining three variables.

The SES index was divided into five categories for analysis purposes. The lowest group had SES index scores below -.25 where the unit is standard deviation units of the whole SES index and the mean is set to zero. There were roughly 22% of the sample in this lowest category. The next to lowest category had scores from -.25 to 0.00 and roughly 35% of the sample was in this category. The third category had scores from 0.00 to +.25 and had roughly 27% of the sample. The next to highest category had scores ranging from +.26 to +.50 and contained roughly 12% of the sample. Finally, the top category had scores above +.50 and contained about 4% of the sample.

Further details on the instruments, on the demographic characteristics of Bayamón Norte, and on the coding of variables are contained in the reports by Nuttall et al (1968); Nuttall (1969), and Nuttall, Nuttall and Sweet (1971).

The basic tool of statistical analysis was multivariate analysis of variance and covariance. However in reporting these results great use is made of the means of the various groups. The model involves two levels of achievement, two levels of sex, and five levels of socio-economic status.

In reporting these analyses figures of the mean scores of high and low achievers of each sex will be plotted against socio-economic group. In the text the significant findings will be discussed. The significance levels used will be probability less than 0.001 unless explicitly stated differently. With samples this large 0.05 or 0.01 significance levels would be associated with very small effects.

In these analyses no missing data was allowed. That is when a student was missing data on one of the variables used in a particular analysis he was dropped from the entire multivariate analysis of variance of that set of data. Thus the sample size fluctuates slightly for each set of data. This is not serious, since most sample sizes are well over 2,500 However the Peer Personality Instrument was only given to seniors and some juniors in the largest public high school. For these analyses the sample size decreases to 880.

An example of the distribution of the sample into the twenty cells of the analysis design is presented in Table 1. The smallest cells are the highest socio-economic status boys and low achieving highest SES girls. The largest cells are the middle and low SES levels for high achievers and the low and lowest SES levels among the low achievers.

Table 1

Sample Size for Multivariate Analysis of Variance

of Study Habits and Attitude Toward School

Socio-economic Status	Low Achievement		High Achievement		Total
	Girls	Boys	Girls	Boys	
Highest	27	29	54	27	137
High	108	106	130	68	412
Middle	266	201	283	108	858
Low	442	312	266	138	1,158
Lowest	322	214	149	68	753
Total	1,165	862	882	409	3,318

RESULTS

A. Home and Family Factors

1. General Background Variables

a. Father's Presence in the Home

An index of the father's presence in the home was developed from a question asking how many months in the last twelve months the father or step-father had lived with the family. The index used in this analysis was the z-score of the number of months with the family. Details of the coding of this question and the construction of its index are given in the Appendix.

The results for the father's presence index are presented in Figure 1. Neither the sex nor the socio-economic status effects were significant. The analysis of variance results indicate a near but not quite significant achievement effect for father's presence (p value of 0.018). The direction of the trend was toward higher achieving students having the father present more.

It can be concluded that, at least as measured here, the extent to which a father was present in the home has only a minor if any effect on academic achievement of the child.

b. Space Index

A question was asked as follows: "How many rooms are in your home?" The respondent was instructed to count all rooms, including kitchens and bathrooms, enclosed porches, etc. A ratio was formed with a numerator the number of persons in the family and the denominator the number of rooms. If a family has as many rooms as people this index is 1.0. If there are twice as many rooms as people, it would be 2.0. If a family had an average of two people for each room the index would be 0.5.

The results are presented in Figure 2. In general the high achieving students of both sexes have more space available per person than do the low achieving students. The achievement effect is significant beyond the 0.001 level and amounts to 0.066 in terms of the metric of the index. Both the sex and the socio-economic status effects were also significant beyond the 0.001 level with boys and higher socio-economic status students having more room.

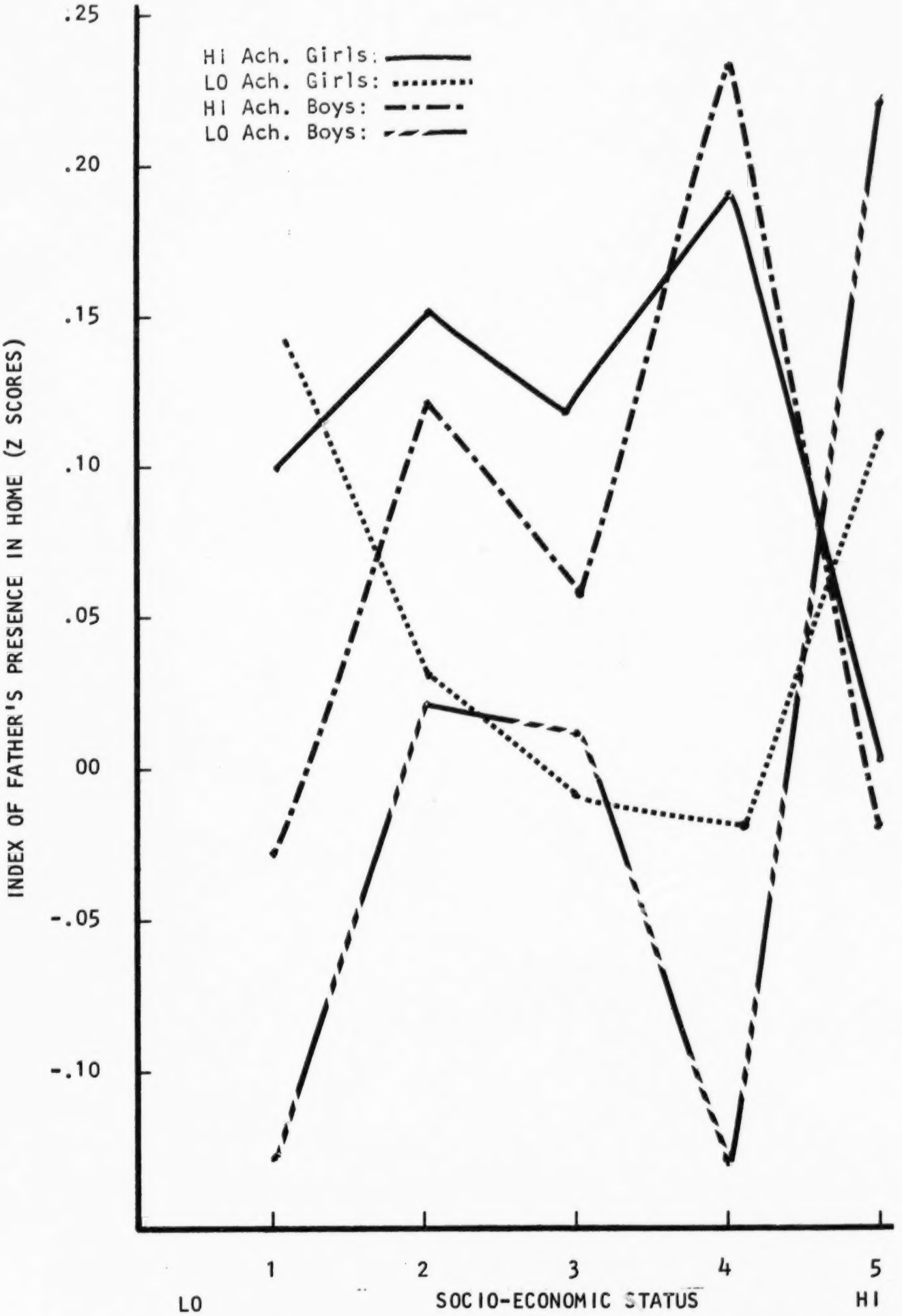

Fig. 1. Father's Presence in the Home Index by socio-economic status for male and female high and low academic achievers.

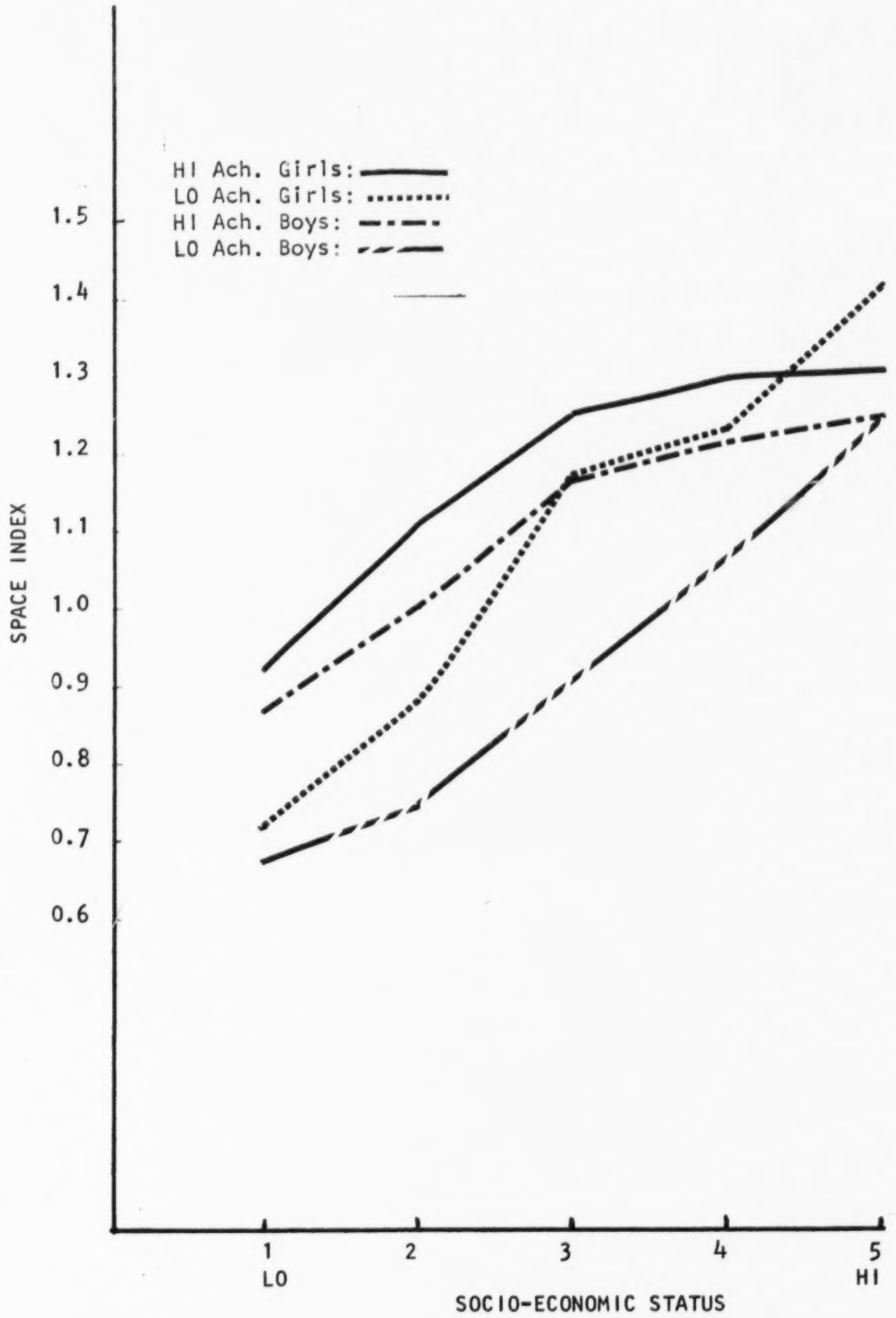

Fig. 2. Space index by socio-economic status for male and female high and low academic achievers.

In the figure there is a hint of an interaction between achievement and socio-economic status with the differences between high and low achieving students being less in the highest socio-economic group. This effect was significant at only the 0.073 level.

In general then, in this study the better students regardless of sex and socio-economic status had somewhat more spacious homes relative to the number of family members living in them.

c. Number of Siblings

The number of children in the family results are presented in Figure 3. There is quite a strong socio-economic status effect, as was expected (Nuttall, Nuttall, and Sweet; 1971). This SES effect seems to bottom out between SES level 4 and SES level 5. In general the higher socio-economic families have fewer children.

The high achieving students, even when controlling for sex of child and socio-economic status had a significant tendency (0.001 level) to have fewer children in their families. This effect was 0.18 children. That is, on the average the families of high achievers had about one fifth of a child fewer children than families of low achievers.

There were no significant interactions between sex, SES, and achievement on number of children in the family.

d. Geographic Mobility

This was measured simply by asking the question "How long have you lived in this community?" with answers ranging from 1 = "One year or less" to 6 = "All my life". The mean on this variable was 3.9 where 4 = "More than 5 years, but not more than 10 years". Figure 4 presents the results. There was no significant sex effect but a marked socio-economic effect and a significant (0.001 level) achievement effect as well. There were no interactions.

The results indicate that, on the whole higher achieving students had tended not to have lived in Bayamón all their lives. In terms of the index the effect is 0.10 which would translate into about half a year shorter residence in Bayamón for the higher achievers than for the low achievers. In contrast the difference between the highest and lowest socio-economic group categories was 0.60 on this index corresponding to an average of about three years shorter residence for the high SES group as contrasted to the lowest SES group.

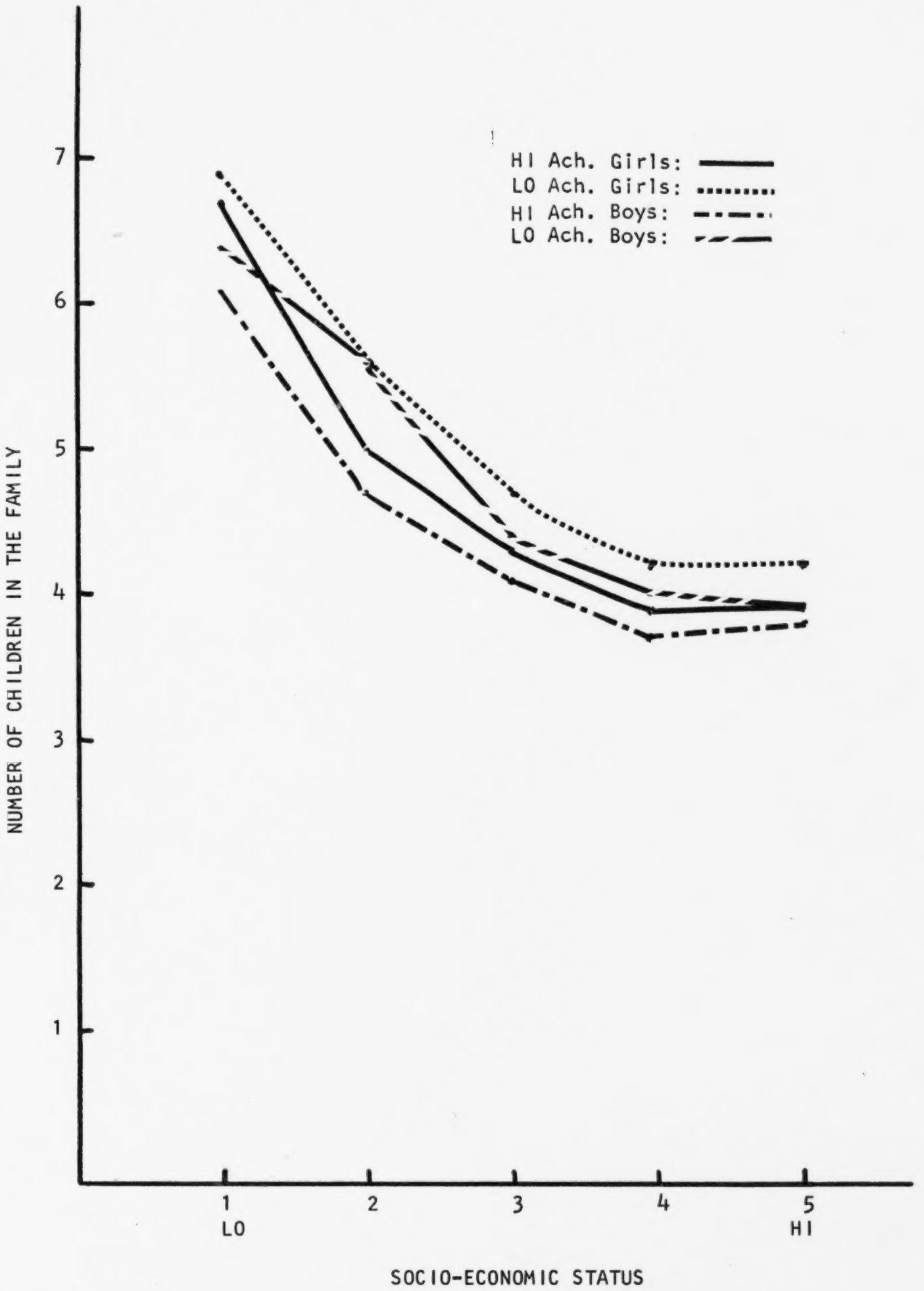

Fig. 3. Number of children in the family by socio-economic status for male and female high and low academic achievers.

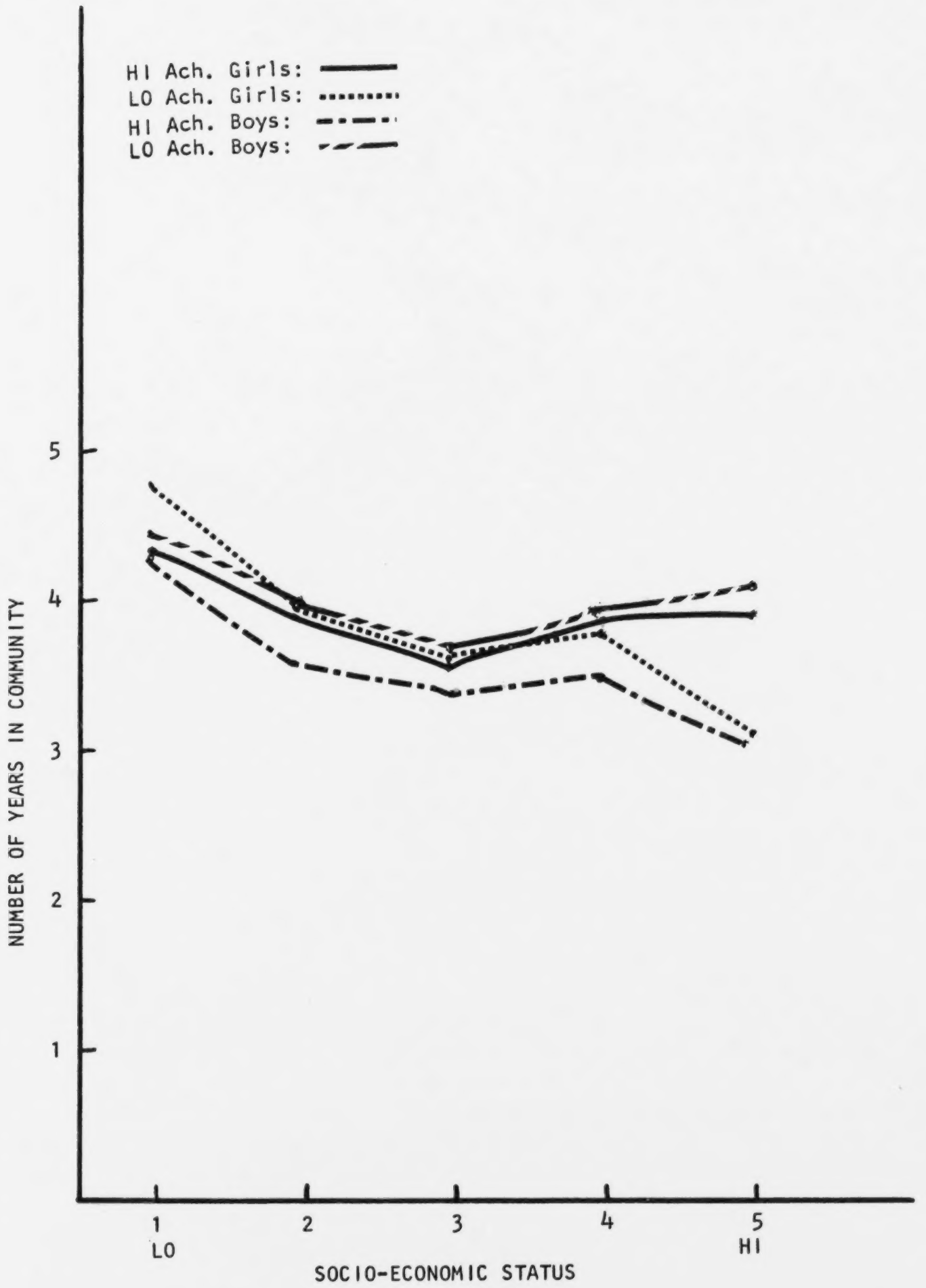

Fig. 4. Number of years in the community by socio-economic status for male and female high and low achievers.

The lack of interactions indicate that even controlling for socio-economic status, the higher achieving student is slightly more likely to come from a mobile family.

e. Education of Parents

The education of the parents results are presented in Figure 5 for Fathers and in Figure 6 for Mothers. Since the SES index was based in large part on parental education the massive and nearly linear relationship between parental education and SES is spurious. Nonetheless it is useful in descriptive terms to examine these results. The mean number of years of education for the highest SES category was in the area of eleven or twelve years, for the lowest category it was around two years of education.

There was a significant achievement effect, even after removing the massive SES effect. Hence students, within a given socio-economic category who were high achievers tended to have fathers with slightly more years of education. The high achievers tended to have fathers with an average of 0.12 years more of education, even after controlling for the large socio-economic status effect.

The effect of mother's education was also significant beyond the 0.001 level for student achievement. However here the tendency was for the high achieving student in the SES category to have a slightly less well educated mother. On the average, controlling for SES, the high achievers had mothers with 0.04 years less education. Both of these effects are very small when compared to the approximately nine years of difference in mean education between the highest and lowest socio-economic status groups.

In summary then, the high achieving student, after controlling for sex and socio-economic status tends to have somewhat more space to live in, tends to have slightly fewer siblings and tends to have lived in Bayamón for a slightly shorter time than the low achieving students. There is also an indication that, after controlling for the massive effects of social class, the high achieving student within a given socio-economic group, tends to have a slightly better educated father but a very slightly less well educated mother than the low achieving student.

Father presence in the home seems to make little difference in student achievement. The lack of interaction in the statistical results indicate that these factors did not tend to differ for boys as opposed to girls, nor for students of high as contrasted to those of low socio-economic status.

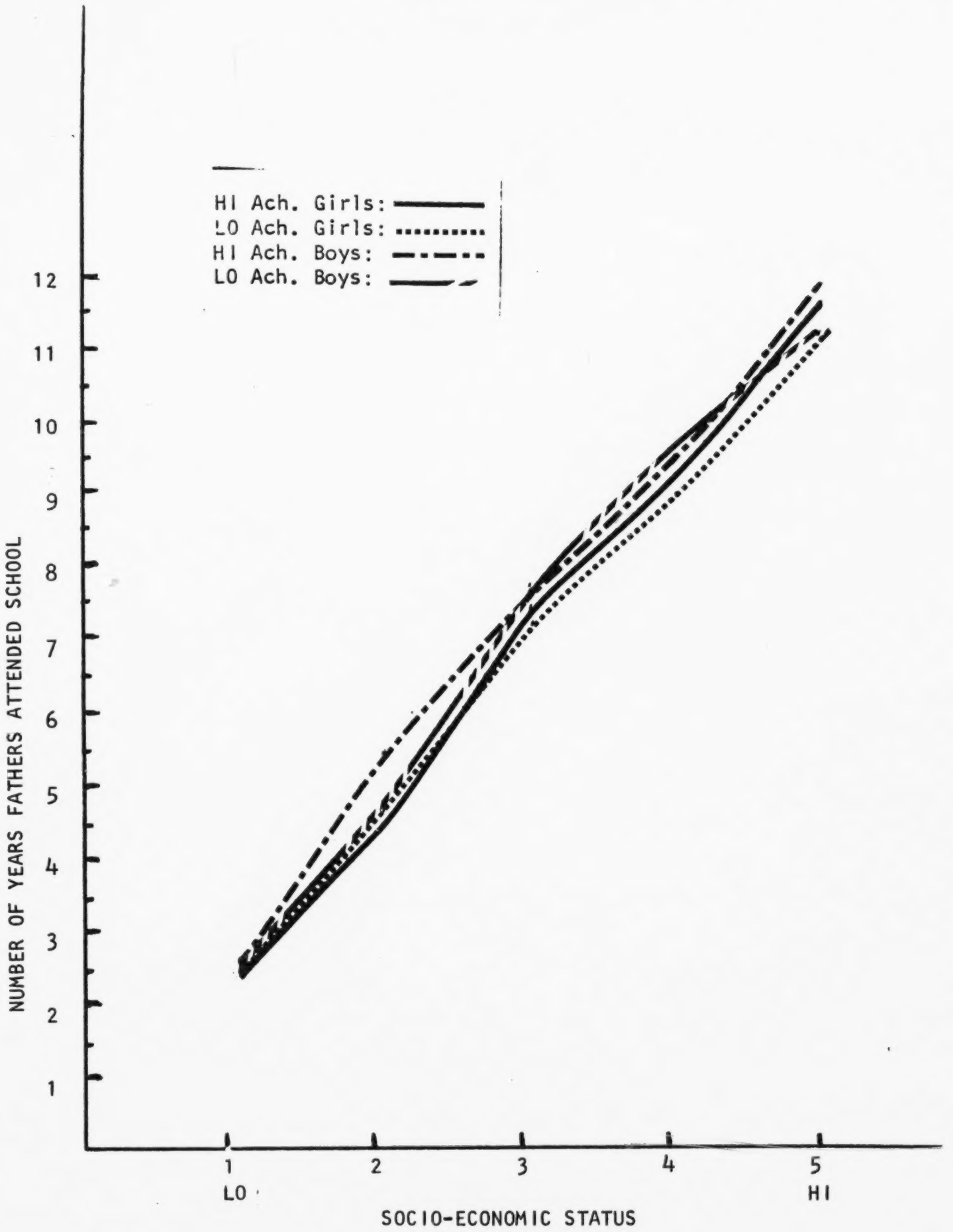

Fig. 5. Number of years fathers attended school by socio-economic status for male and female high and low academic achievers.

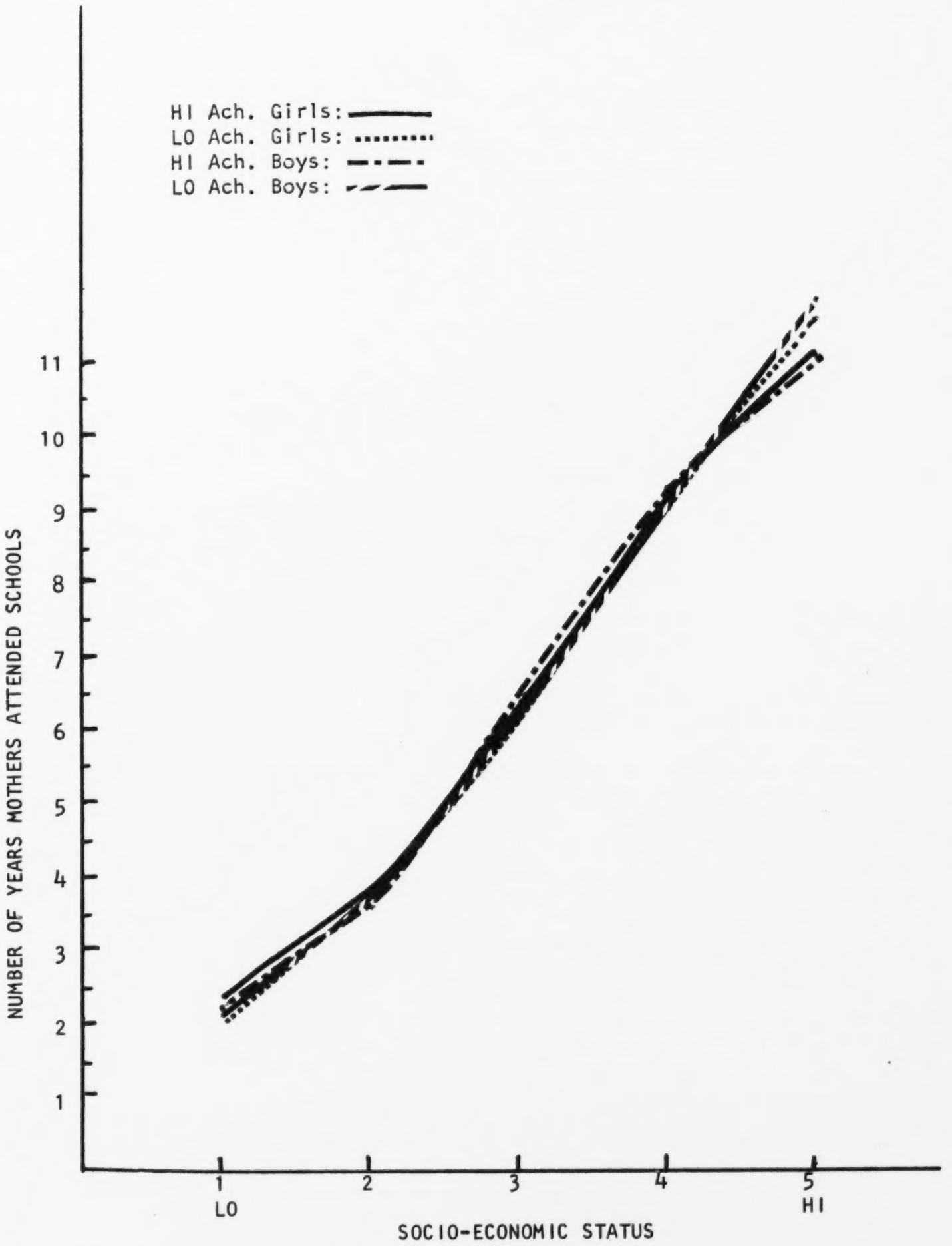

Fig. 6. Number of years mothers attended school by socio-economic status for male and female high and low academic achievers.

2. Parent-Child Relationships

In this research Schaefer's (1965) Children's Report of Parental Behavior Inventory (CRPBI) was translated and adapted to the Puerto Rican culture by Dr. Ena Vazquez de Nuttall. A factor analysis of the scales from this instrument was conducted separately for the 18 Mother scales and for the 18 Father scales. In each case three factors accounting for 74% of the variance were found. These factors, when rotated to Varimax criteria, were found to replicate very closely the three factors Schaefer had found. For the research reported here "factor scores" were obtained by summing together those scales loading most highly or "composing" each factor.

The first factor was termed Acceptance and was composed of scales for Acceptance, Child-Centeredness, Possessiveness, Positive Involvement, Intrusiveness, and Acceptance of Individuation. The second factor, Hostile Psychological Control, was composed of the scales of Control through Guilt, Hostile Control, Control through Instilling Persistent Anxiety, Control through Withdrawal of Relationship, Rejection, Hostile Detachment as well as Inconsistent Discipline, Control, and Enforcement. The third factor, Autonomy, was composed of the scales of Extreme Autonomy, Nonenforcement, and Lax Discipline.

In the multivariate analysis of variance there were no significant interactions among the factors of sex, socio-economic status and achievement. There were significant first order effects for all three variables.

For Achievement, controlling for the sex of the child and for socio-economic status, the high achieving student tends to have been highly Accepted by his mother while his Acceptance from his father was not quite significant in its relationship to achievement (significance level only 0.016). Both parents of the high achieving child are low on Hostile Psychological Control scores and neither gives him too much Autonomy. The low achieving child then tends to feel that his mother does not Accept him, both parents tend to ignore him, and when they do pay attention to him it is with Hostile Psychological Control methods.

For the sex effect, neither the father's nor the mother's Acceptance was significantly associated with the sex of the child. Boys were just as likely to feel highly accepted as were girls. On the other hand boys felt themselves to be subject to higher levels of Hostile Psychological Control than did girls. This was so for both parents. However girls felt that their mothers gave them significantly less Autonomy than boys felt subject to. That is, boys were more likely to feel that their mother ignored them or disciplined them very little.

The multivariate analysis of variance indicated that there were two significant socio-economic status effects in this parent-child relationships realm. The first effect was linearly related to SES level, the second effect peaks at the second and third SES groups (stable working class) in contrast to those higher and those lower in socio-economic status.

The linear socio-economic status effect indicated that low SES students, as contrasted to high SES students, felt that their fathers used greater Hostile Psychological Control over them. This effect did not hold for mothers. These low SES students also felt that neither parent was very highly Accepting of them, while the higher SES students did feel that both parents were Accepting of them. The mothers of the low socio-economic status students were seen as giving little attention to their children, that is the child felt he had excessive Autonomy.

The second socio-economic status effect contrasted the stable working class with both higher and lower status groups. The educational level of this stable working class group parents was from four to eight years of education. This working class group was likely to give their children considerably more Acceptance from the father, less Autonomy from the father, more Hostile Psychological Control from the mother and considerably more Autonomy from the mother than were the parents of either higher or lower socio-economic status. Thus this working class group had a sharply differentiated parental role structure, with the father doing quite different things than the mother did.

The effects of the individual parent-child relationship factors are presented in Figures 7 through 12. Since there were no interactions, the main effects can be taken at face value. The most powerful single parent-child relationship factor was Hostile Psychological Control. Figure 9 demonstrates this effect for father's Hostile Psychological Control. As can be seen there, high achieving students receive less Hostile Psychological Control than do low achieving students. Boys generally have more Hostile Psychological Control from their fathers than do girls, and higher SES families use less Hostile Psychological Control than do lower SES families. The figure demonstrates the second SES effect by the peak in Hostile Psychological Control for the middle SES group for the low achieving boys. A similar phenomena is observable in Figure 10 for mother's Hostile Psychological Control, and im Figures 11 and 12 for Autonomy.

In conclusion, the parent-child relationships most conducive to academic achievement, regardless of the sex of the child or his socio-economic level, are high Acceptance from the mother, little use of Hostile Psychological Control by either parent, and a willingness to pay attention to the child and not to grant him excessive Autonomy.

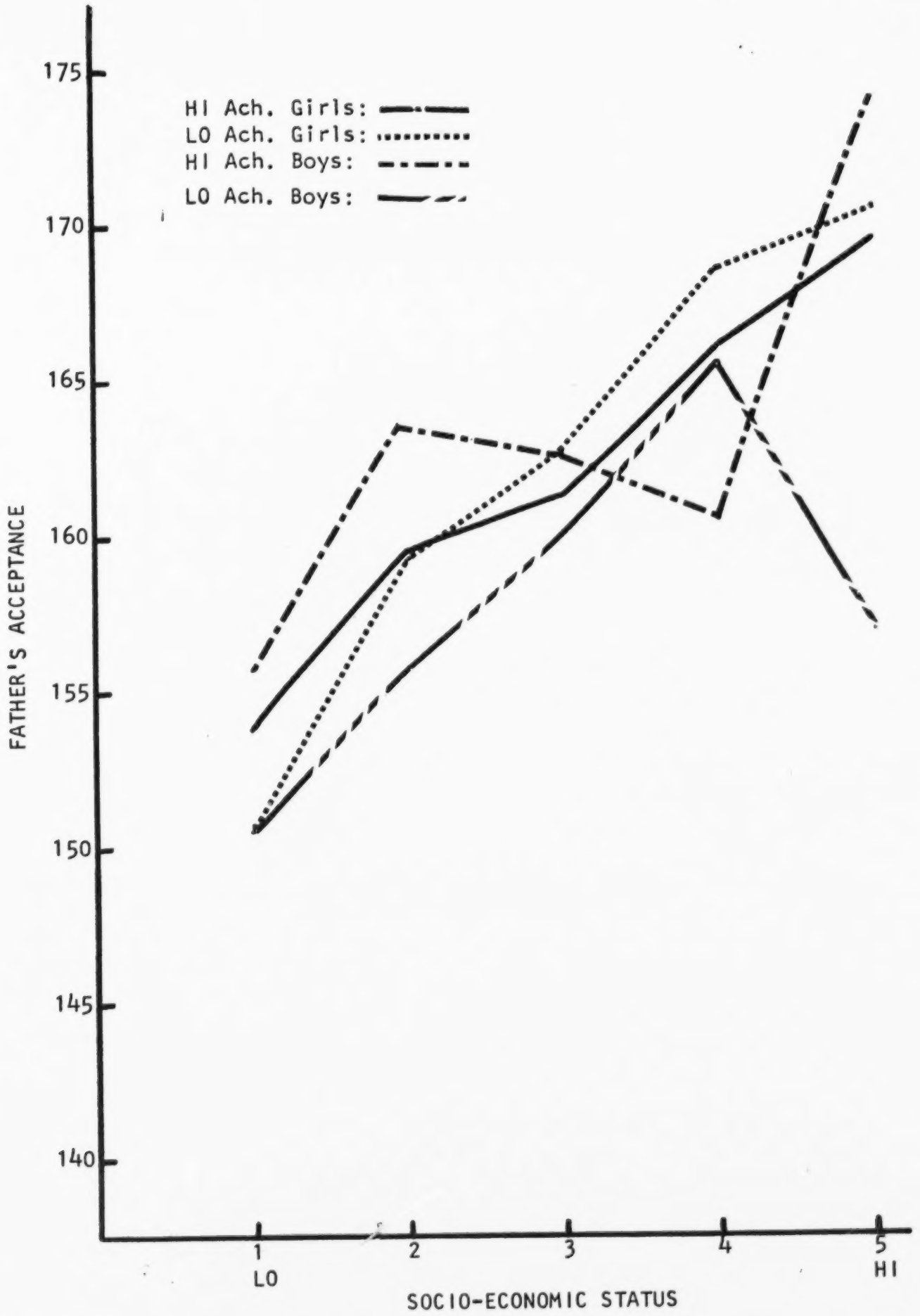

Fig. 7. Father's acceptance by socio-economic status for male and female high and low academic achievers.

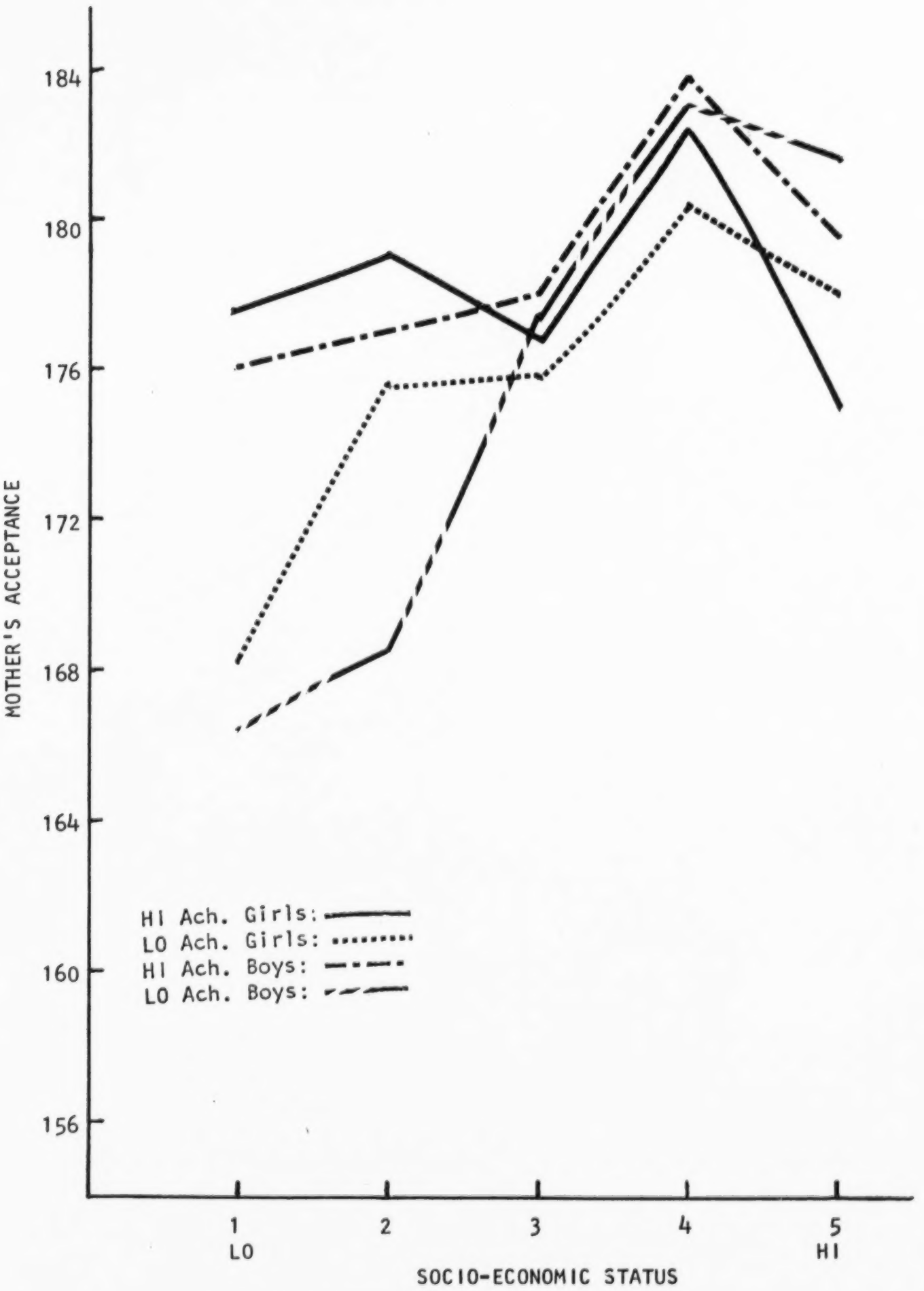

Fig. 8. Mother's acceptance by socio-economic status for male and female high and low academic achievers.

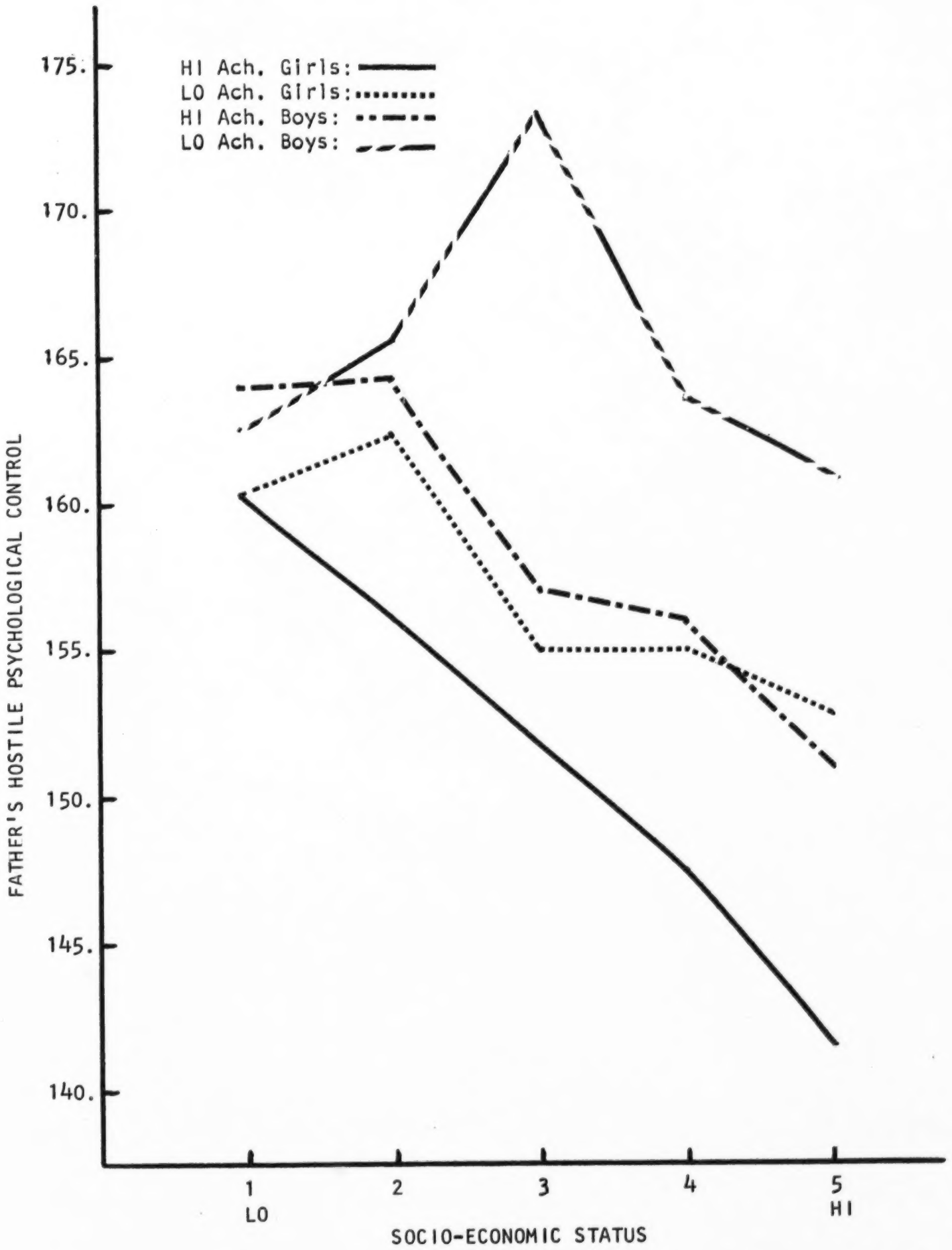

Fig. 9. Father's Hostile Psychological Control by socio-economic status for male and female high and low academic achievers.

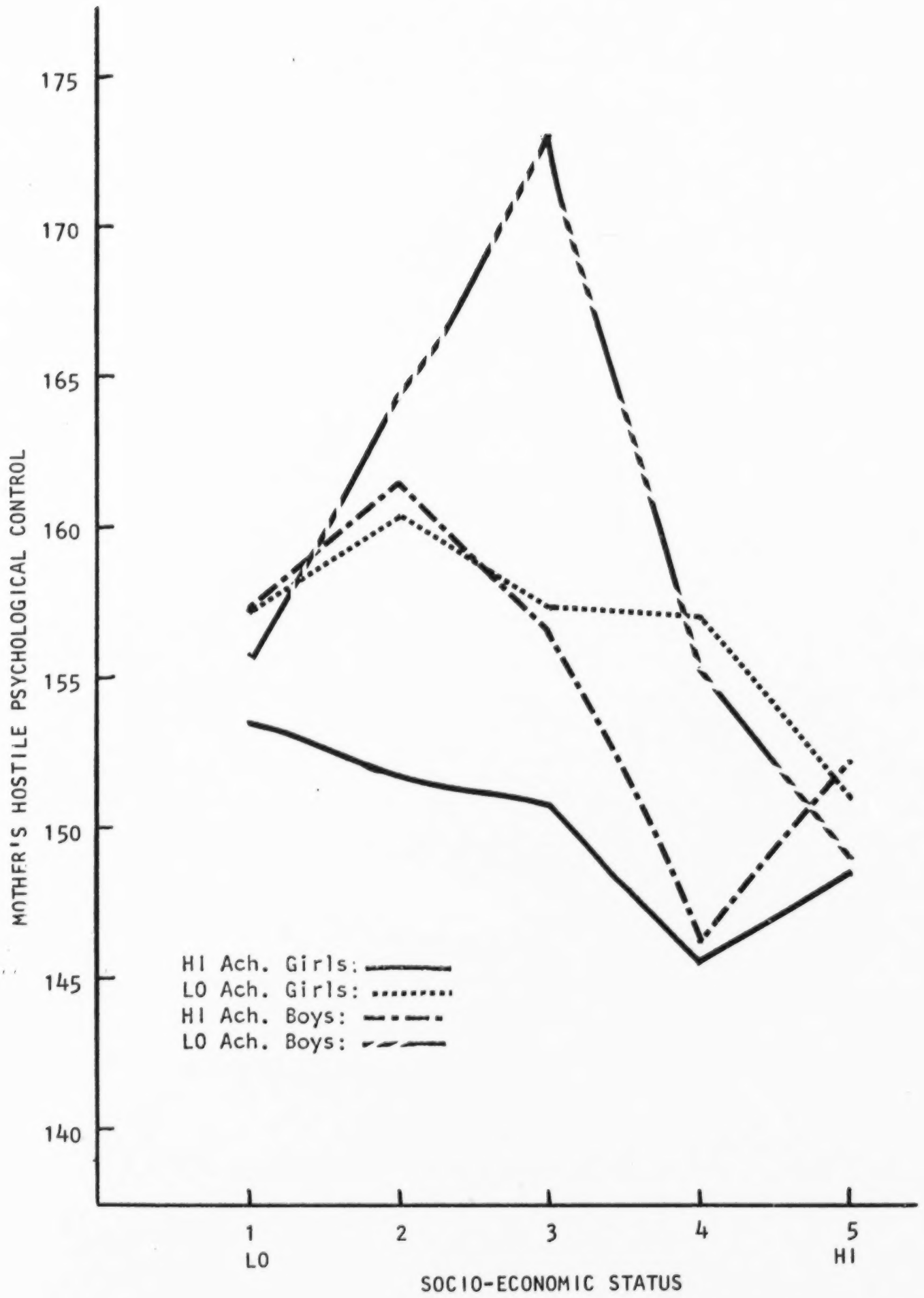

Fig. 10. Mother's Hostile Psychological Control by socio-economic status for male and female high and low academic achievers.

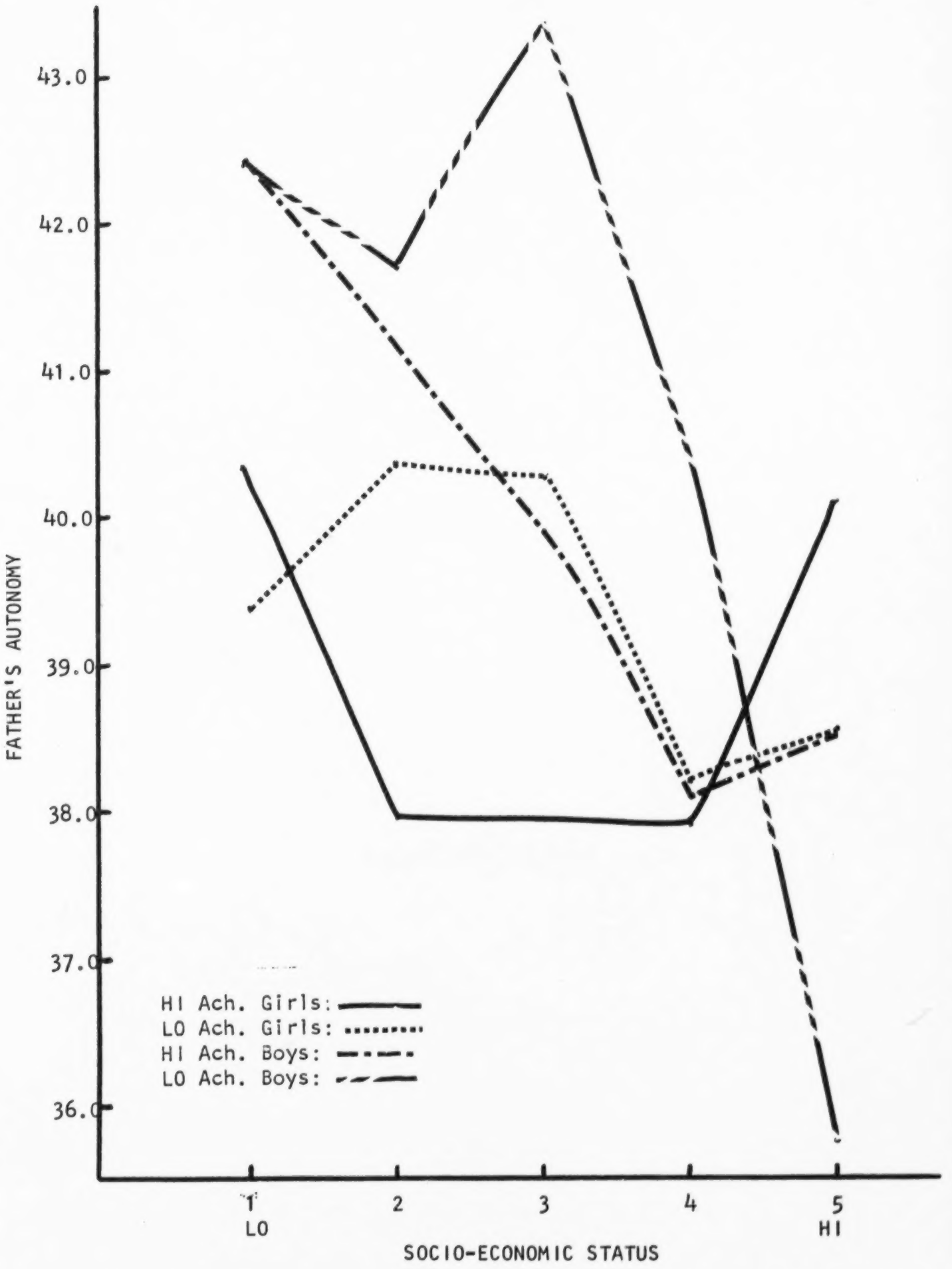

Fig. 11. Father's Autonomy by socio-economic status for male and female high and low academic achievers.

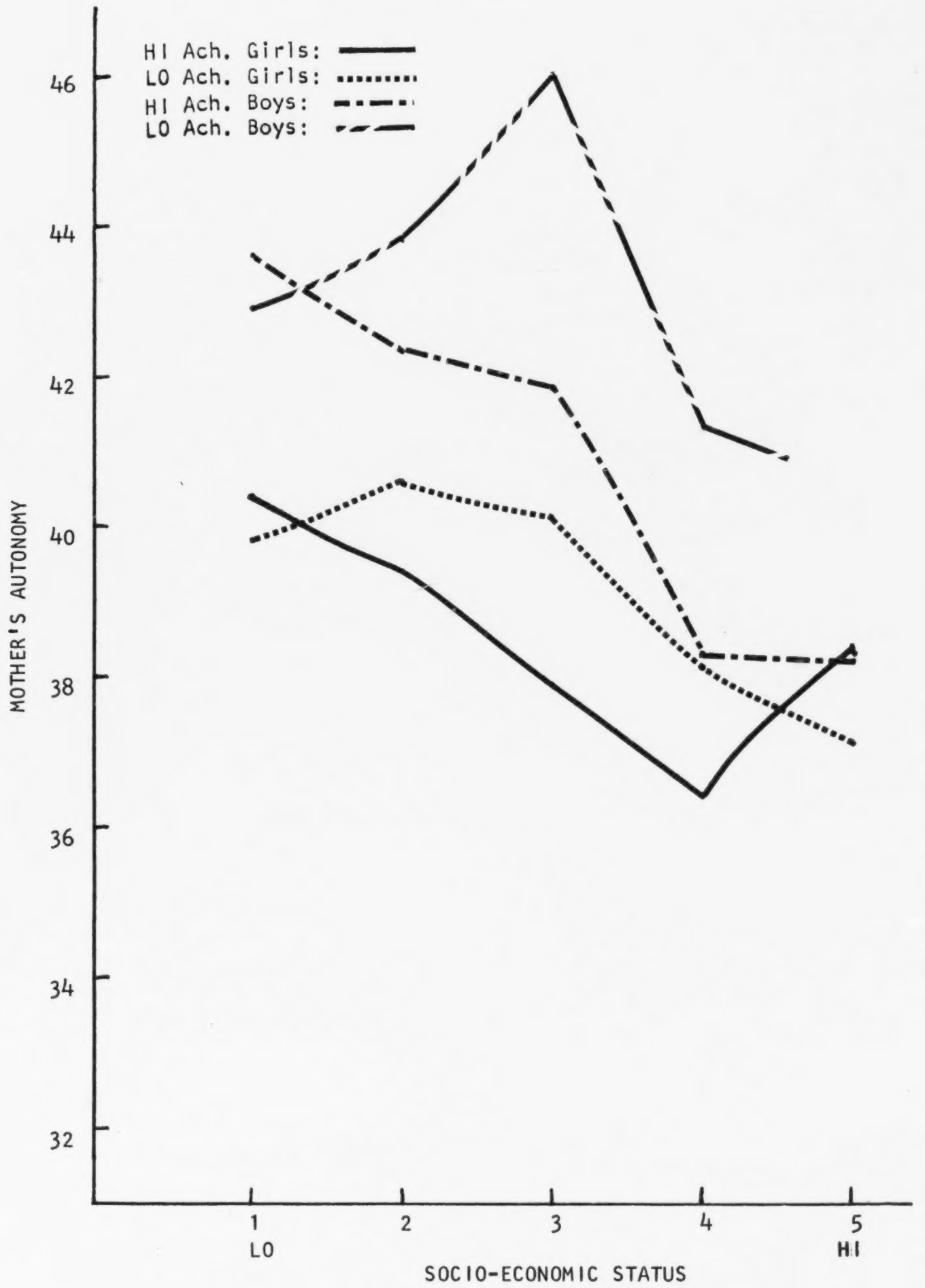

Fig. 12. Mother's Autonomy by socio-economic status for male and female high and low academic achievers.

B. Personality Variables

1. Cattell's High School Personality Questionnaire

The 1969 version of form A of the Cattell High School Personality Questionnaire (HSPQ) was translated and adapted to Puerto Rican Spanish under the direction of Dr. Ena Vazquez de Nuttall for this research. Previous research (Nuttall, 1969; Nuttall and Poggio,1970; Poggio and Nuttall, 1970) have indicated that the general structure of the Spanish language version of the HSPQ is similar to that of the English language version. From a scree test, more than 14 factors, probably 16 factors were to be found in a factor analysis of the 142 items. Rotating 14 factors to an oblique promax solution allowed four HSPQ factors (B, D, H, and I) to be matched to four of the obtained promax factors. Using a factor mandate procedure outlined by Horst (1965) it was possible to rotate all 14 factors to a moderately good fit to the HSPQ factors. In only one case (Factor O) was the Coefficient of Congruence higher off the major diagonal than on it. Factor B, Intelligence and Factor I, Esthetic Sensitivity were especially well matched.

However, when the correlations among these oblique factors were examined, essentially no similarity appeared between the Puerto Rican data and the factor intercorrelations appearing in the HSPQ Handbook.

Examination of the mean raw scores for the Puerto Rican students as contrasted to the Handbook reports for American and British students indicates that the Puerto Ricans are more like the Americans than like the British, and are generally less Excitable, less Dominant, less Enthusiastic, more Esthetically Sensitive, less Individualistic, less Guilt-Prone, and have greater Will-Power than either the American or the British students.

In the present research a multivariate analysis of variance was run with three factors of sex, socio-economic status and academic achievement as independent variables and the fourteen HSPQ personality traits as dependent variables. From previous research it had been predicted that the high achievers of all socio-economic status levels and of both sexes would be more Intelligent (Factor B), Conscientious (G), Tender-Minded (I), Controlled (Q3), Placid (low on Factor O), Groupminded (low on J), and more Emotionally Stable (C).

The results are more complex than these predictions. The multivariate analysis of variance had a triple interaction significant beyond the 0.001 level and a double interaction between sex and achievement which was also significant. This means that

the significant first order effects for achievement, sex, and socio-economic status must be examined for the interactions present. In brief, those personality factors affecting academic achievement do vary by sex of the student and by his socio-economic level.

The results are presented in Figures 13 through 26. Factor A, Sociability, is presented in Figure 13. This trait has little bearing on academic achievement but there are quite large sex and socio-economic status effects. Girls are more Outgoing than are Boys and the higher socio-economic status students are more Outgoing and participating than are the lower status youngsters.

As might be expected, Factor B, Intelligence shows a major impact on academic achievement. For both boys and girls and across all socio-economic levels, the higher achieving student tends to be more intelligent. However these results, as graphed in Figure 14, indicate another interesting phenomena. The low achieving girls seem to be more intelligent than the low achieving boys across all SES levels. Further there seems to be a decrease in the intelligence of the low achieving girls of the highest socio-economic group. On the whole this factor does not exhibit as high a socio-economic effect as do several of the other factors, even though the higher social background students do seem to be somewhat more intelligent than those from lower SES backgrounds.

Contrary to the prediction, Factor C, Ego-Strength, does not have a major academic achievement effect. These results are given in Figure 15. A major sex effect exists, across socio-economic and achievement levels, with boys having higher Ego-Strength scores than girls. That is the boys are more emotionally stable while the girls are more affected by their feelings. There is some indication that at the upper SES levels the academically successful boys have more Ego Strength than do the academically weak boys.

The picture presented of the results in Figure 16 for Factor D, Excitability, is somewhat confusing. However, in general the high achievers are less Excitable, more phlegmatic than are the academically less competent. This is true in every socio-economic group for the girls and in four of the five groups for the boys. There is also a significant sex effect with the boys being more excitable and the girls being more phlegmatic. There is essentially no socio-economic status effect.

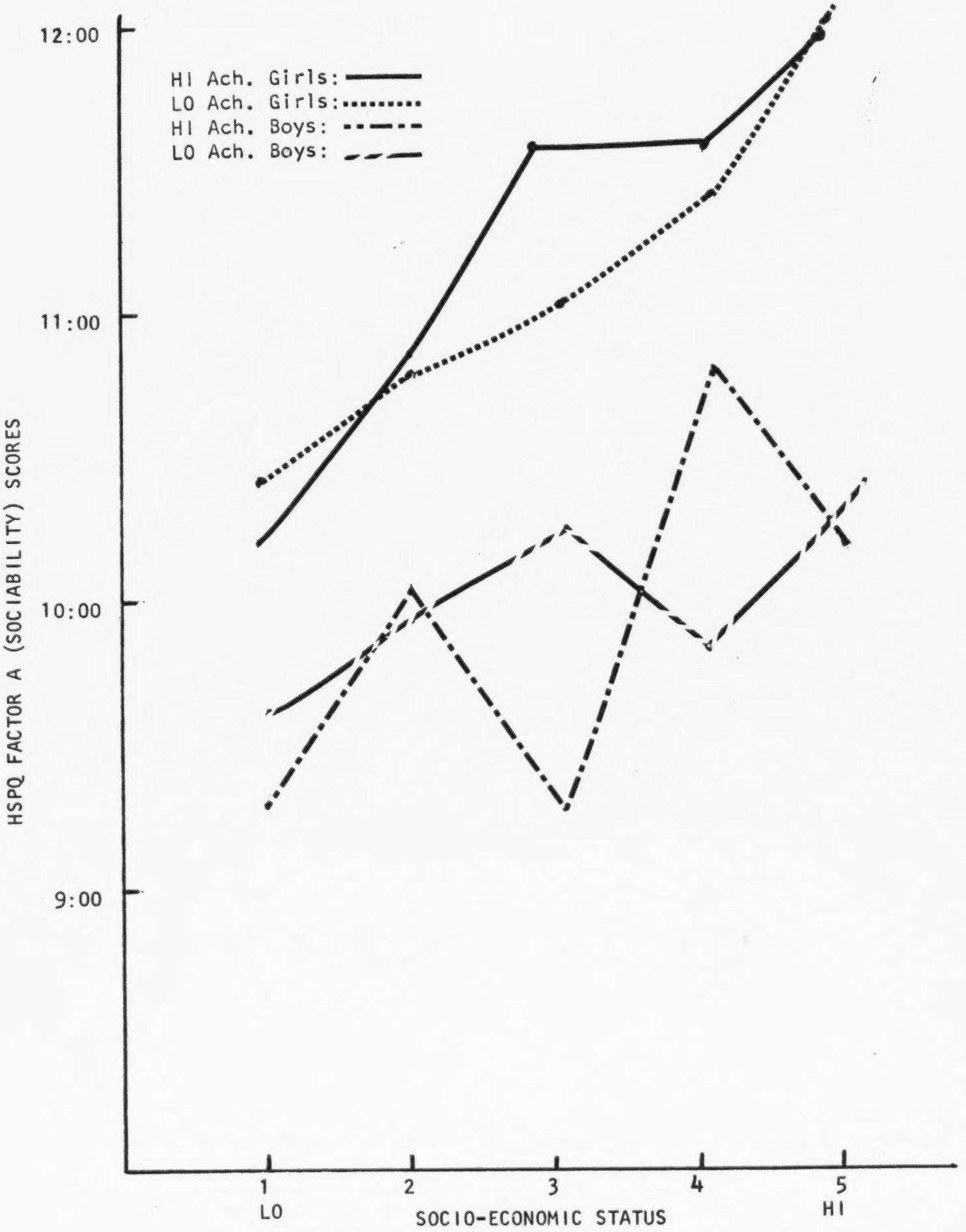

Fig. 13 HSPQ Factor A: (Sociability) scores for male and female high and low academic achievers.

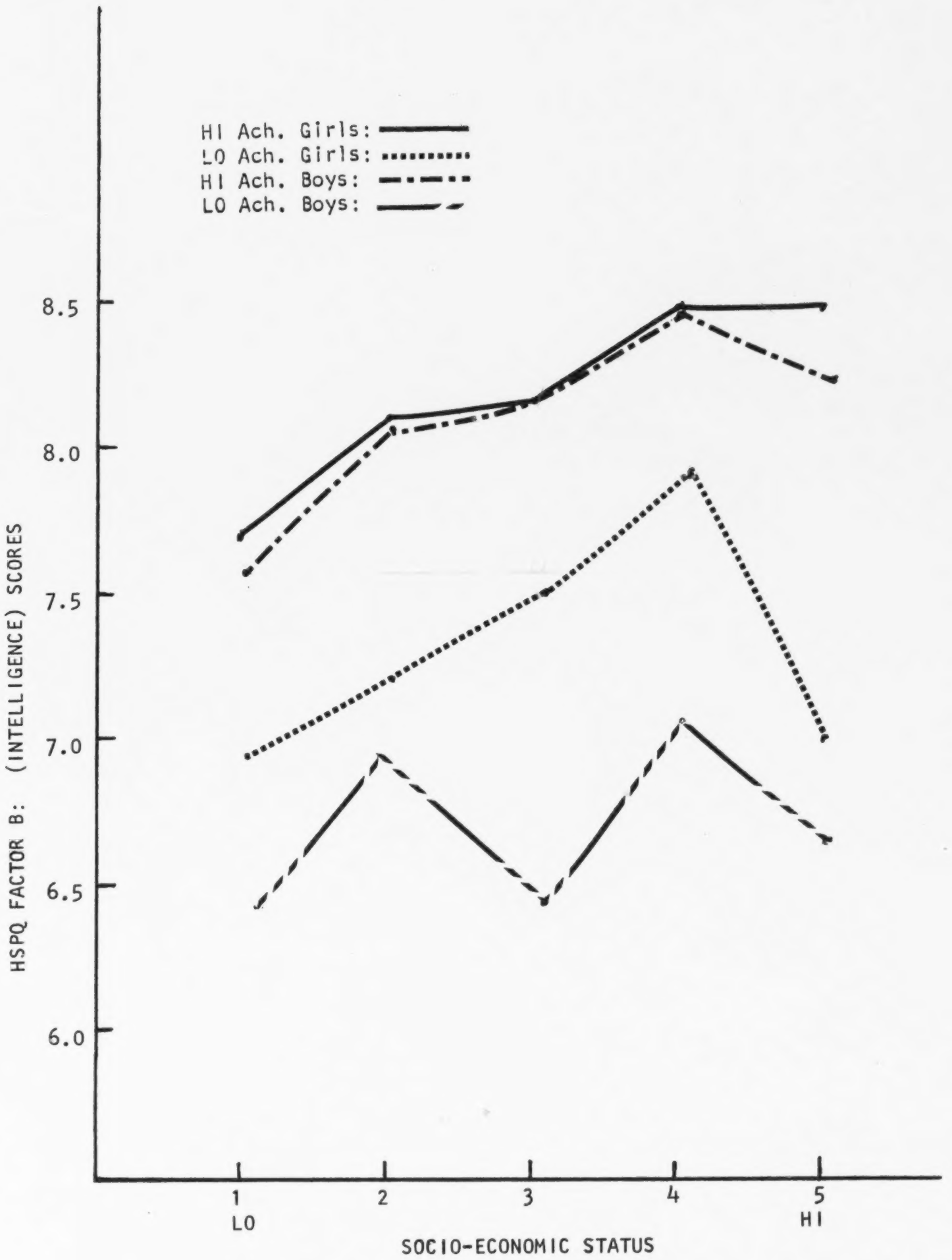

Fig. 14 HSPQ Factor B: (Intelligence) scores for male and female high and low academic achievers.

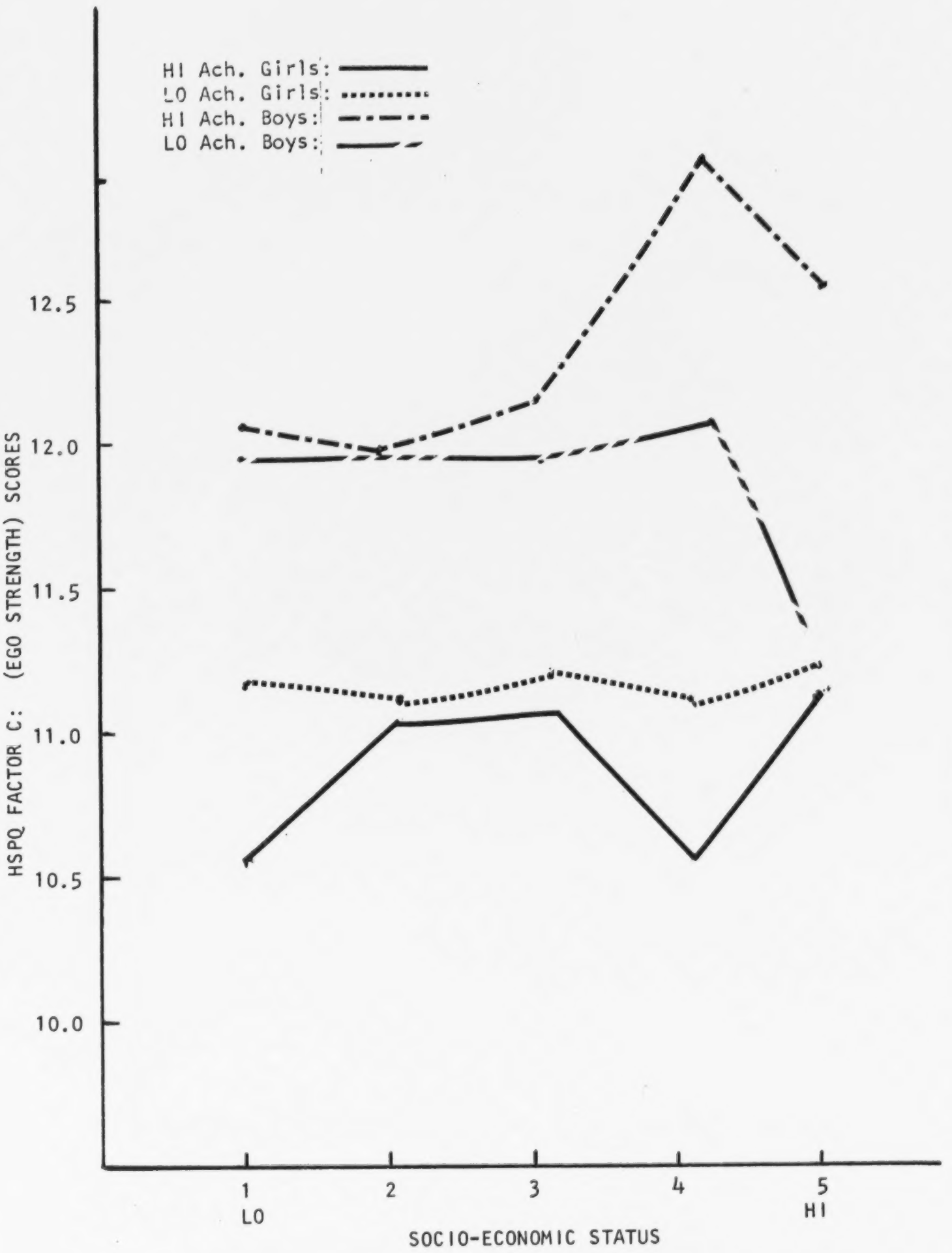

Fig. 15 HSPQ Factor C: (Ego Strength) scores for male and female high and low academic achievers.

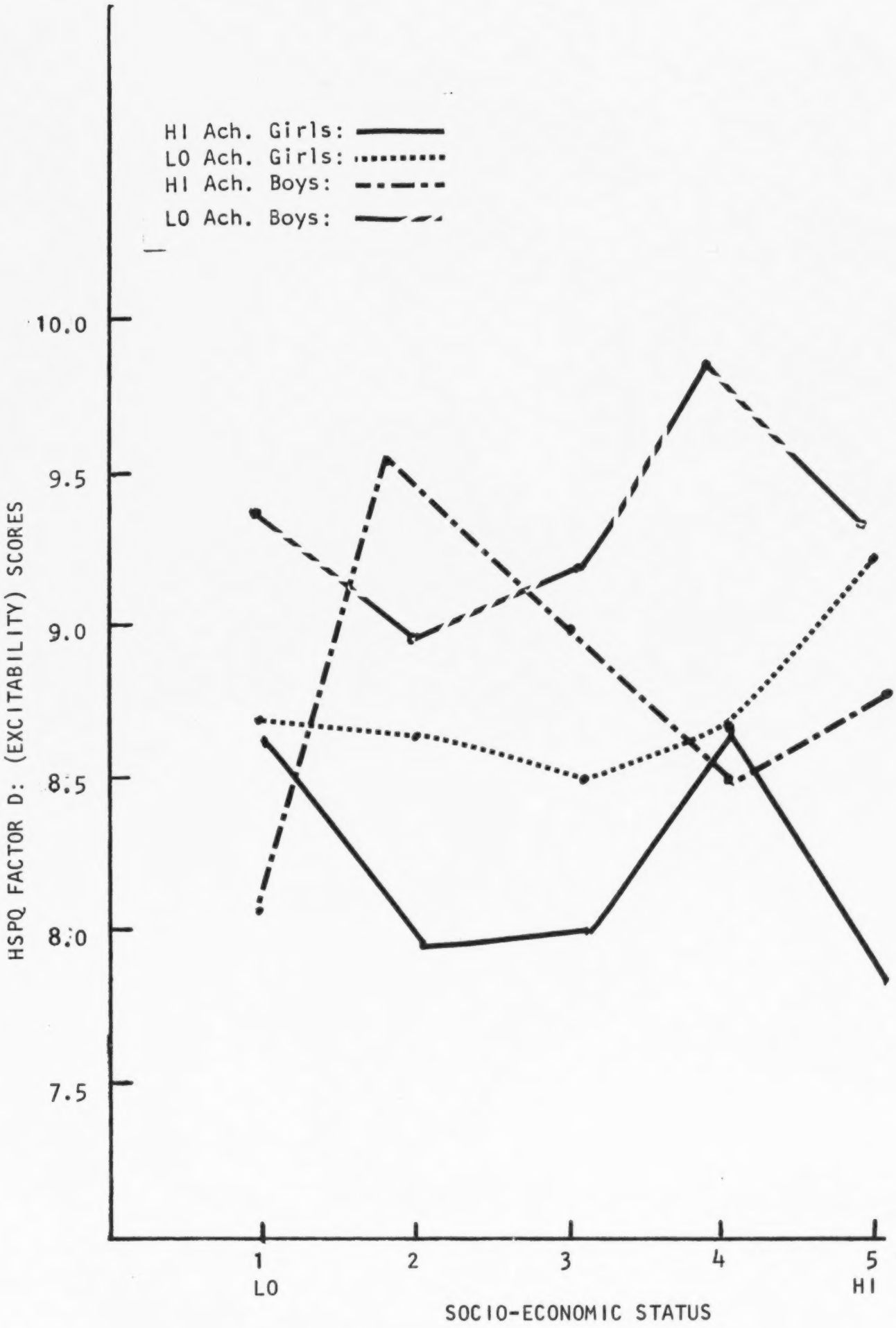

Fig. 16 HSPQ Factor D (Excitability) scores for male and female high and low academic achievers.

Factor E, Dominance, shows a massive sex effect, a reasonably sized socio-economic effect, as well as an achievement effect in Figure 17. Boys are much more dominant than are girls and higher socio-economic youngsters of both sexes are more dominant than those from lower status backgrounds. On the other hand the more academically competent of either sex or of any socio-economic status (with the exception of highest status girls) are less dominant than are the academically low achievers. High grades go with obedience and submission.

Enthusiasm, Factor F, results are given in Figure 18. The achievement effect is small but significant. The high achievers are less enthusiastic, more sober, prudent and serious, than are the low achievers. The sex and the socio-economic status effects are considerably larger than is the achievement effect. In general boys are considerably more enthusiastic than are girls and higher social status youngsters tend to be considerable more enthusiastic than the lower status students. The low socio-economic status girls are marked by their sober and serious personalities.

Figure 19 gives the results for Factor G (Conscientiousness). There is a major difference between the academic achievers and the non-achievers on this factor. The good students are much more conscientious, persevering, and rule-bound than are the poor students. The socio-economic status effect is negligible and non-significant but there is a major sex effect. Girls are considerably more conscientious than are boys. In the Figure it is striking how low on conscientiousness are the low achieving boys.

Thick-Skinnedness, Factor H, has no achievement effect. However the sex effect, as demonstrated in Figure 20, is large and consistent across socio-economic levels. Boys are much more thick-skinned, venturesome and socially bold than are girls. Girls tend to be more shy, restrained and timid than are boys. There is a significant socio-economic status effect with both boys and girls of higher status being more venturesome while the lower status youngsters are more timid.

Factor I, Aesthetic Sensitivity, results are presented in Figure 21. The academically more proficient students are more aesthetically sensitive, more tenderminded, dependent and sensitive than are the less academically successful. This is especially true for girls, however the effect holds for both sexes at all socio-economic levels. There is a major sex effect, with the girls being far more aesthetically sensitive than are the boys. There is no socio-economic status effect.

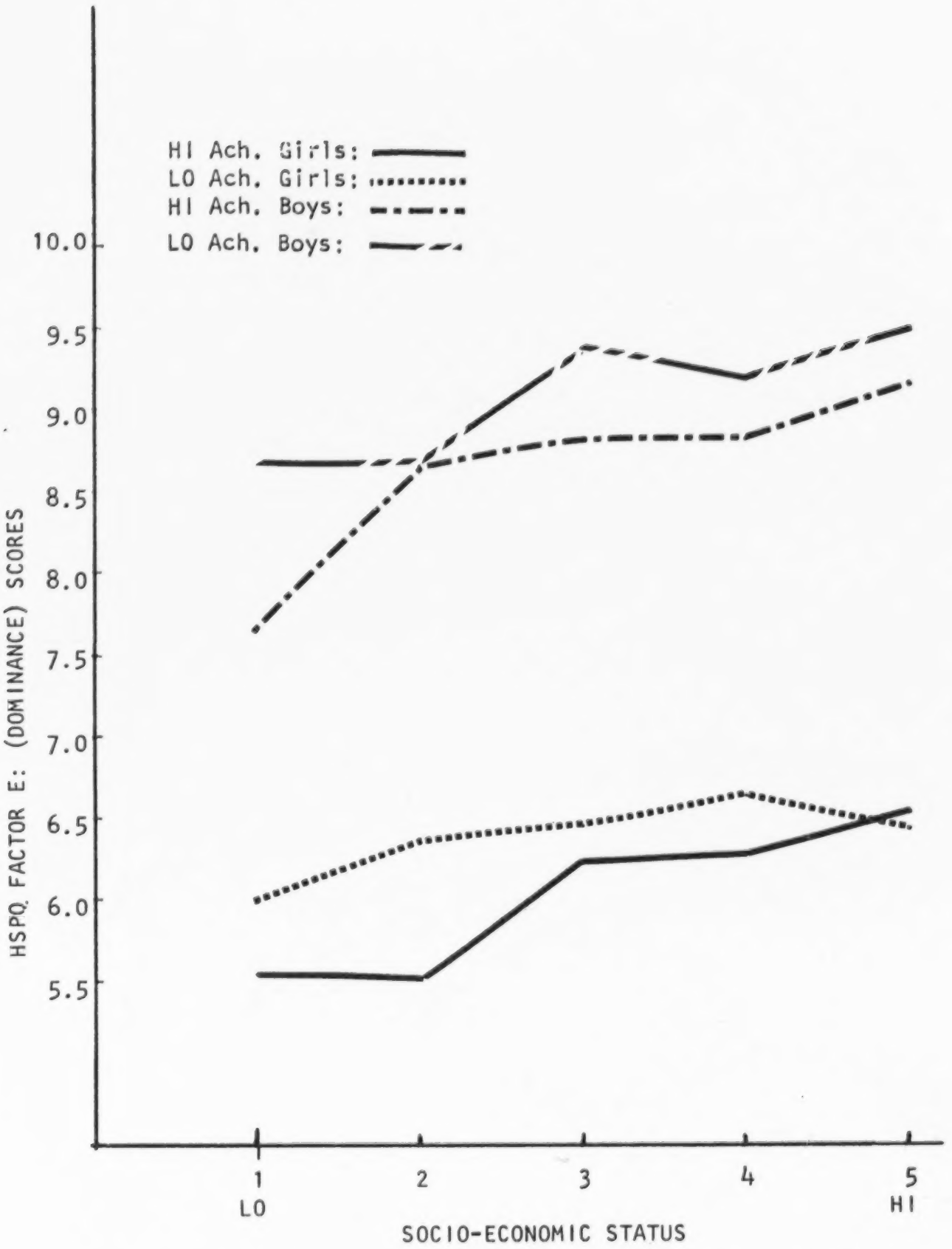

Fig. 17 HSPQ Factor E (Dominance) scores for male and female high and low academic achievers.

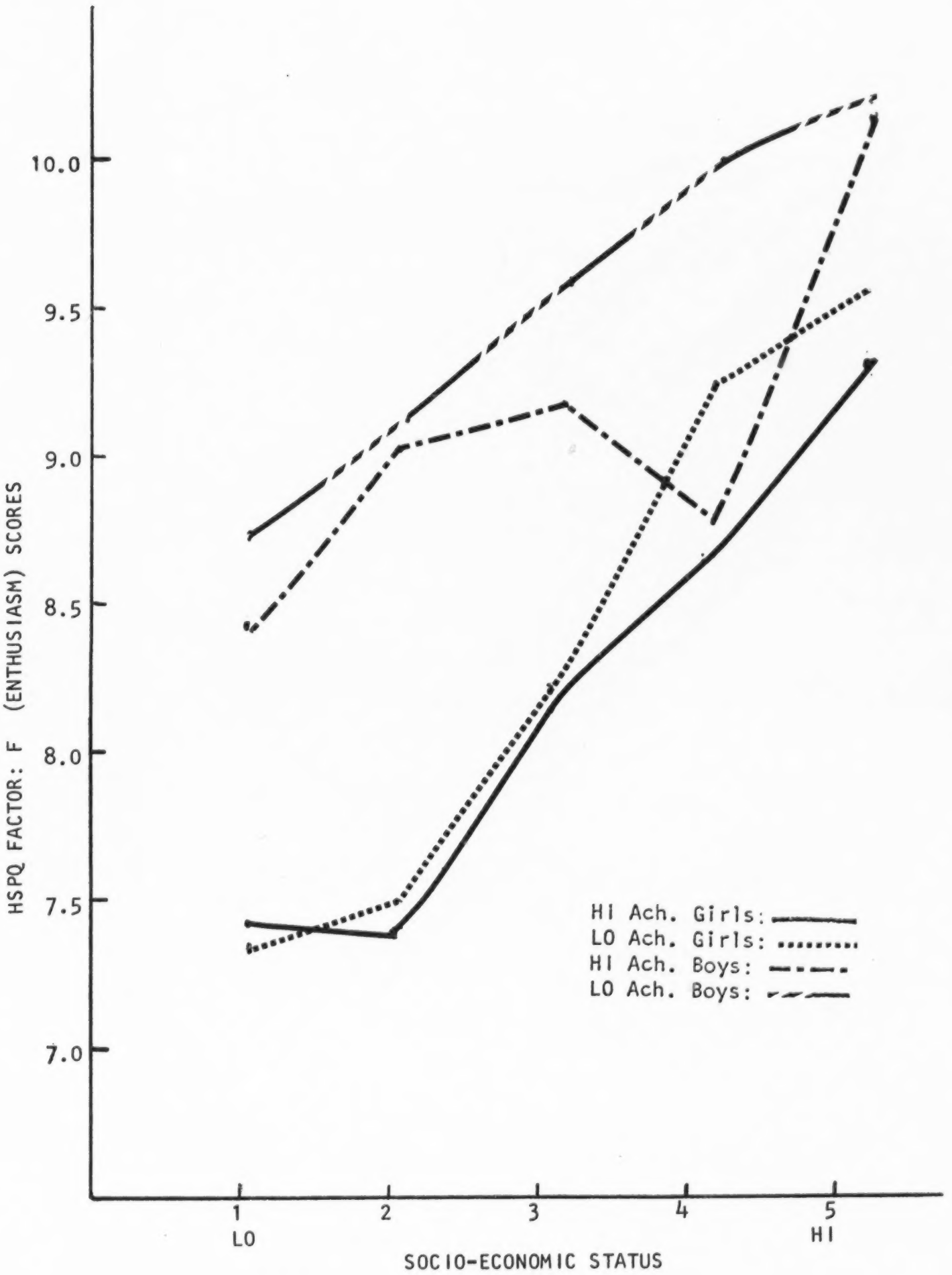

Fig. 18 HSPQ Factor F: (Enthusiasm) scores for male and female high and low academic achievers.

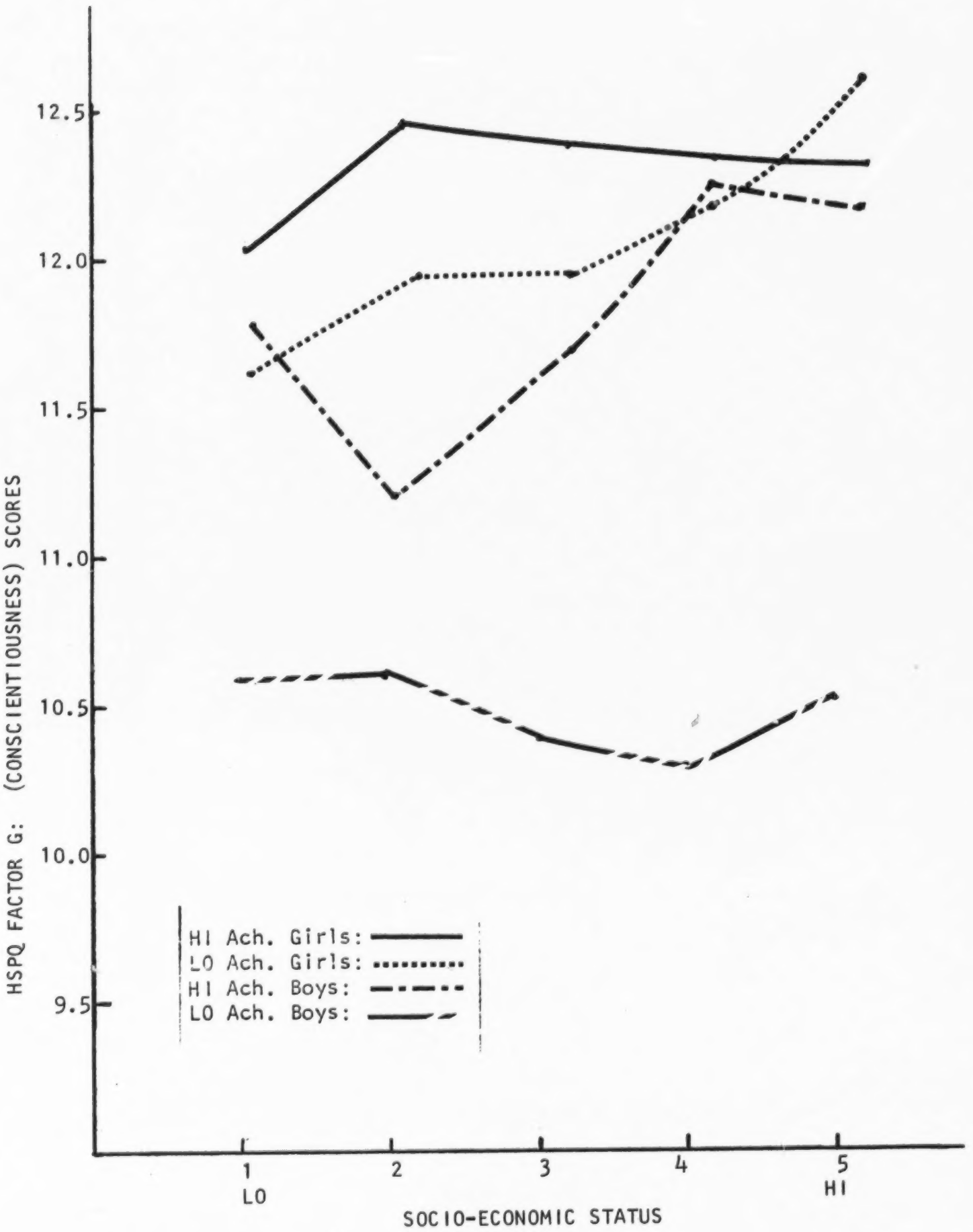

Fig. 19 HSPQ Factor G: (Conscientiousness) scores for male and female high and low academic achievers.

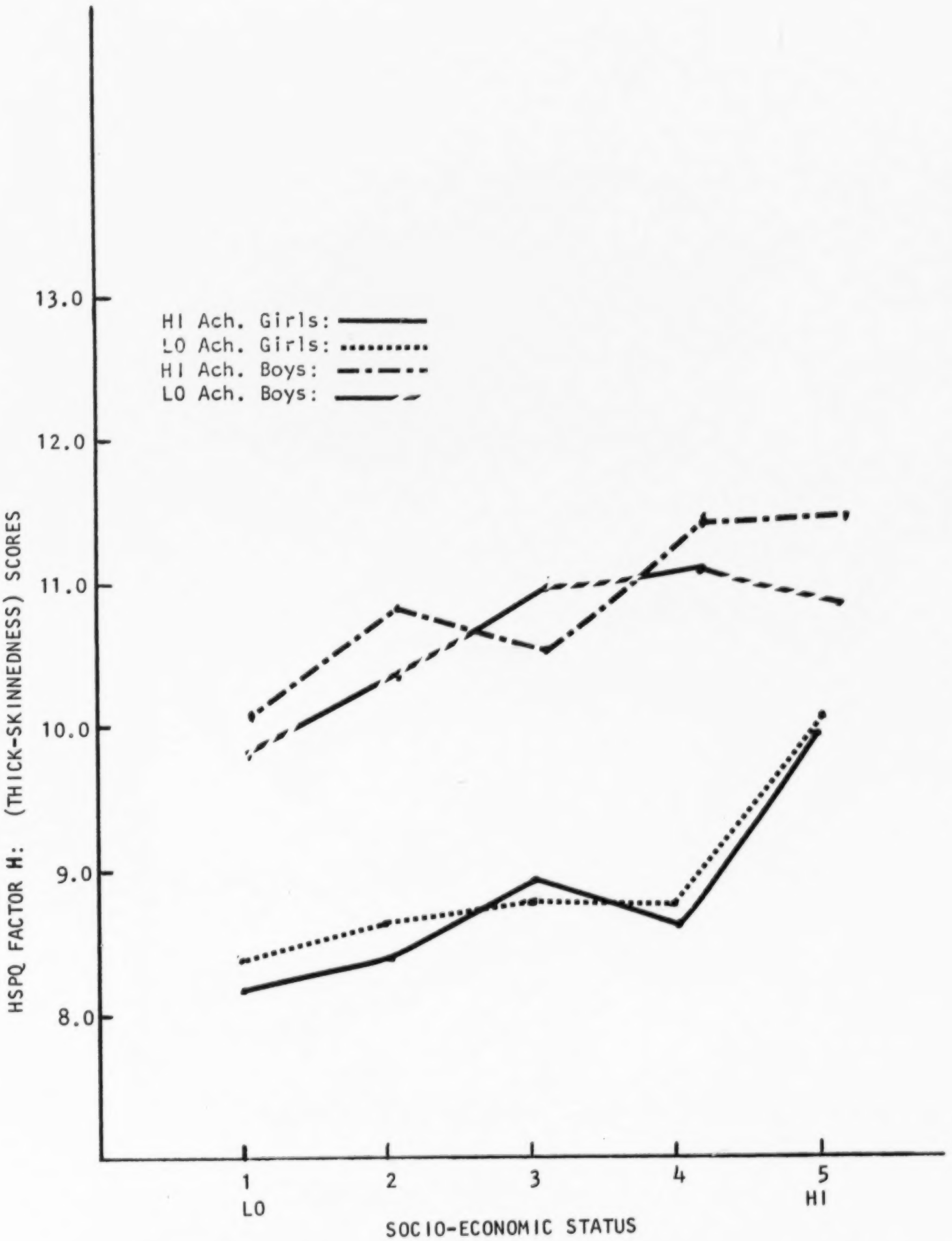

Fig. 20 HSPQ Factor H: (Thick-Skinnedness) scores for male and female high and low academic achievers.

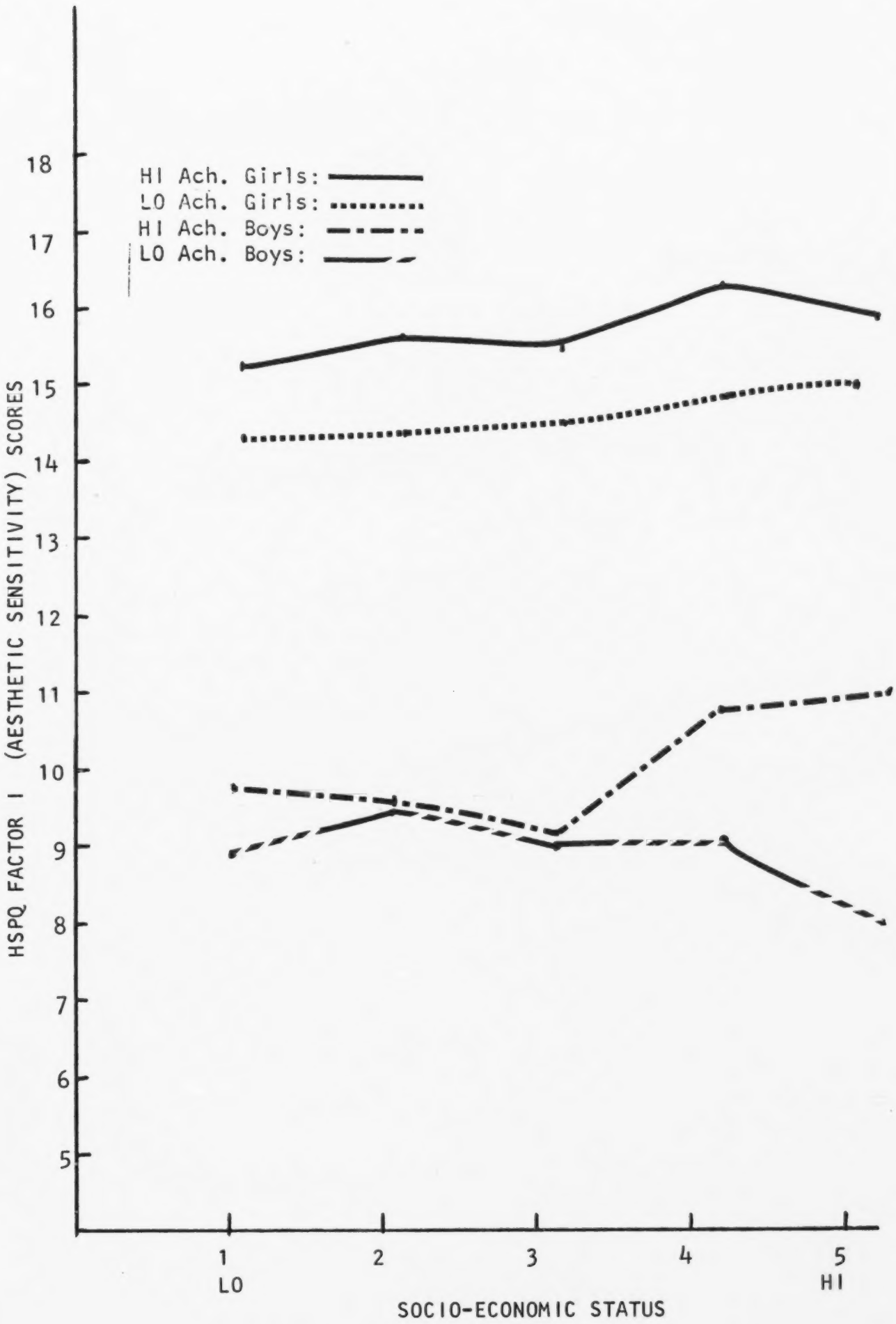

Fig. 21 HSPQ Factor I (Aesthetic Sensitivity) for male and female high and low academic achievers.

Factor J, Individualistic, as demonstrated in Figure 22 shows all three main effects. The high achievers are less individualistic, more vigorous, zestful and given to action than are the low achievers. In general girls are less individualistic and go more readily with the group than do boys. Similarly the higher socio-economic status students are less individualistic, doubting and obstructive than are the lower socio-economic status students.

Guilt Proneness, Factor O, results are given in Figure 23. There is no significant sex effect, boys are just as likely as girls to be high on guilt proneness, but there is a major achievement effect. Low achieving students of both sexes and of most social class levels tend to be more guilt-prone, apprehensive, worrying, and troubled than are the more academically proficient students. There is a small socio-economic status effect with the higher status youngsters tending to be more placid and confident while the lower status youngsters are more apprehensive and worrying.

As indicated in Figure 24, boys and girls differ markedly on Factor Q2, Self-sufficiency, but there is no significant achievement effect. Boys come out as more self-sufficient and resourceful on this scale while girls tend to be more group dependent and joiners. There is a significant socio-economic status effect, with the higher SES students being somewhat more group dependent and somewhat less self-sufficient. While there was not a significant main effect for achievement for this personality trait, there was a significant interaction between sex and achievement for self-sufficiency. This interaction can be noted in the figure. The high achieving boys do tend to be more self-sufficient than are the low-achieving boys. No such tendency is apparent for girls. The triple interaction between achievement, sex, and SES is almost significant (p less than 0.005) as indicated by the figure where girls and low achieving boys tend toward lower self-sufficiency scores with increasing SES level while high achieving boys tend toward constant or even increasing self-sufficiency scores with increasing socio-economic level. In this sample, high achieving boys of middle to high SES level tend to be more self-sufficient than low achieving boys and much more self-sufficient than both achieving and non-achieving girls. At the low SES levels self-sufficiency scores do not distinguish achieving from non-achieving boys.

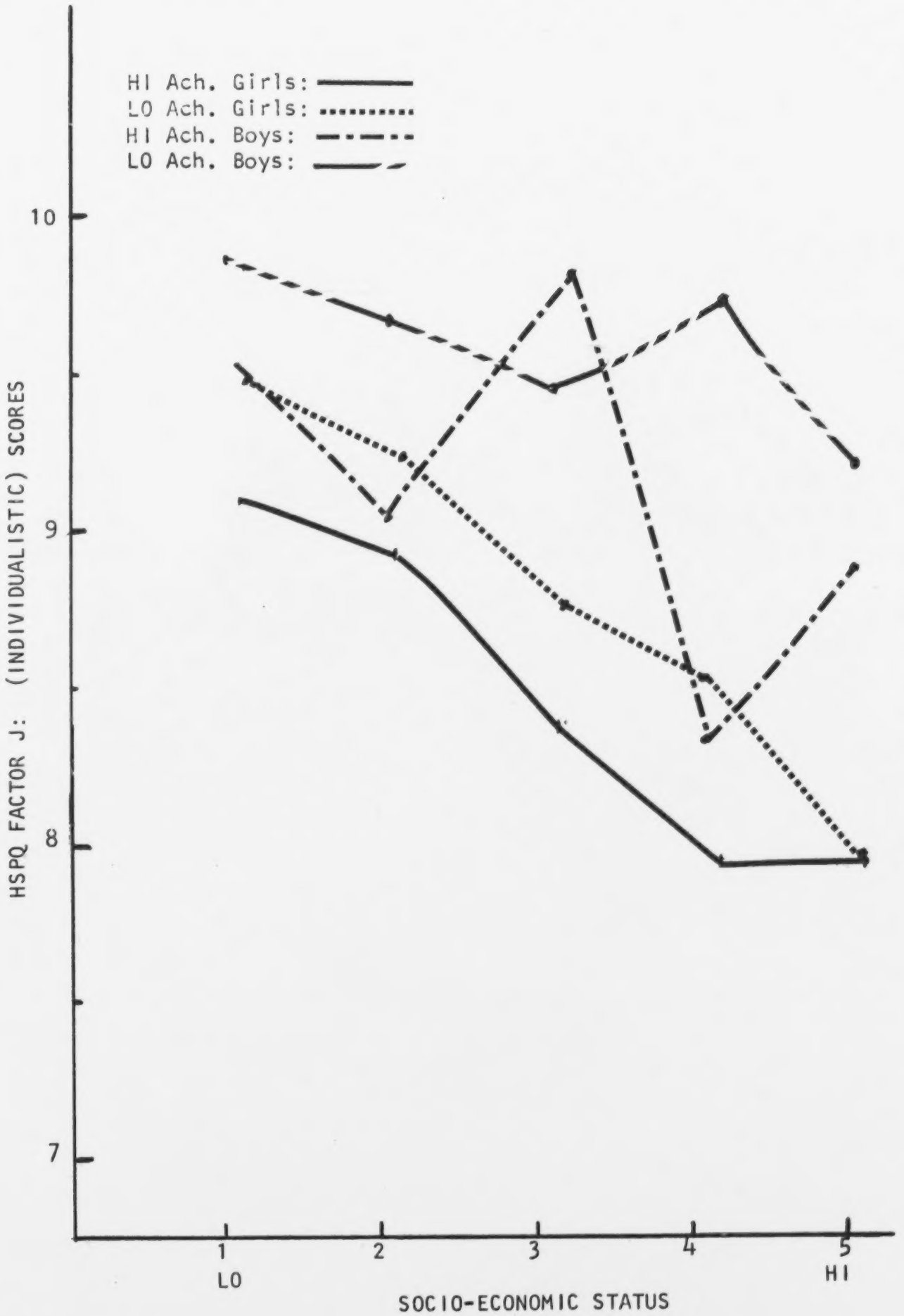

Fig. 22 HSPQ Factor J: (Individualistic) Scores for male and female high and low academic achiever.

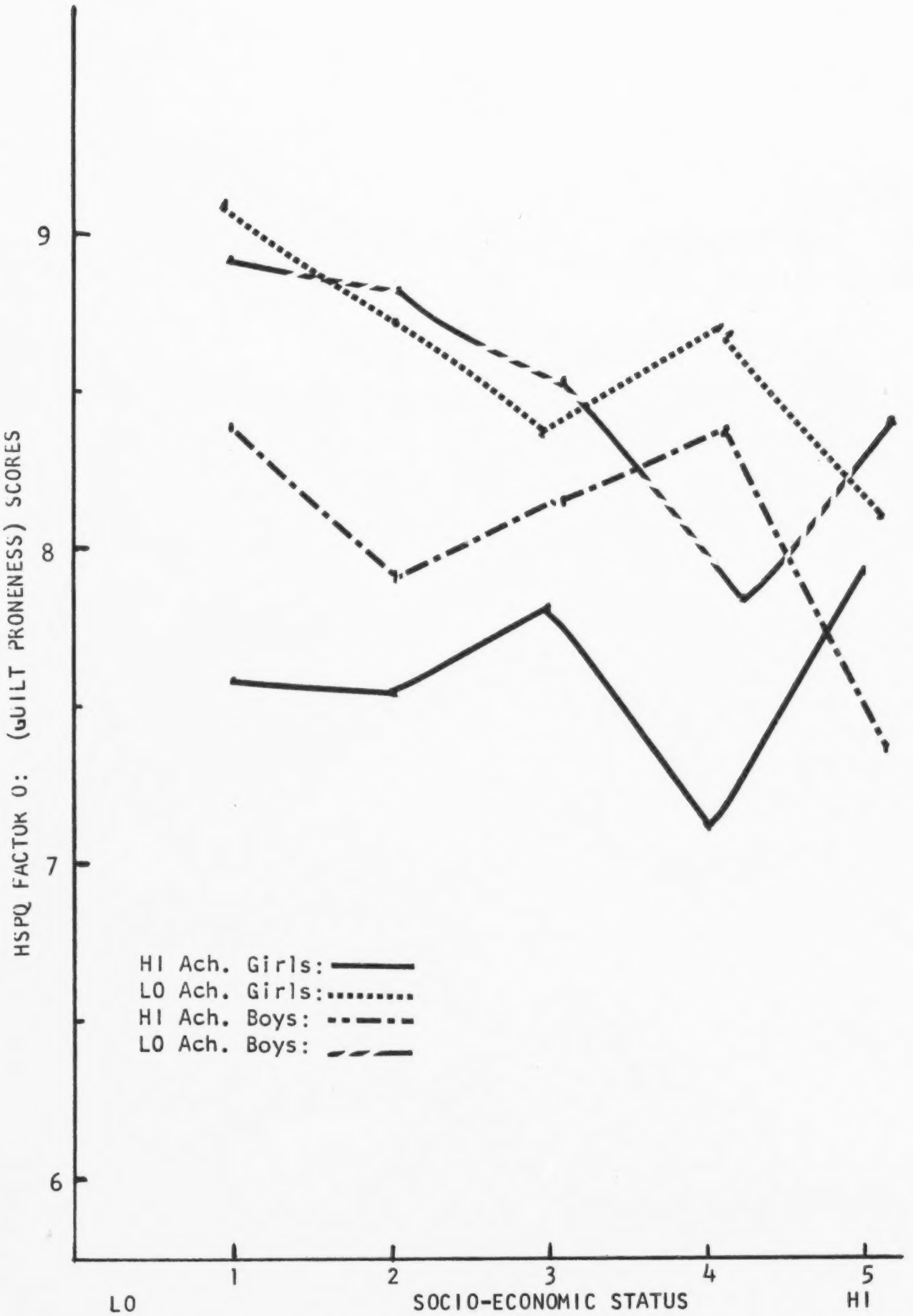

Fig. 23 HSPQ Factor O (Guilt Proneness) scores for male and female high and low academic achievers.

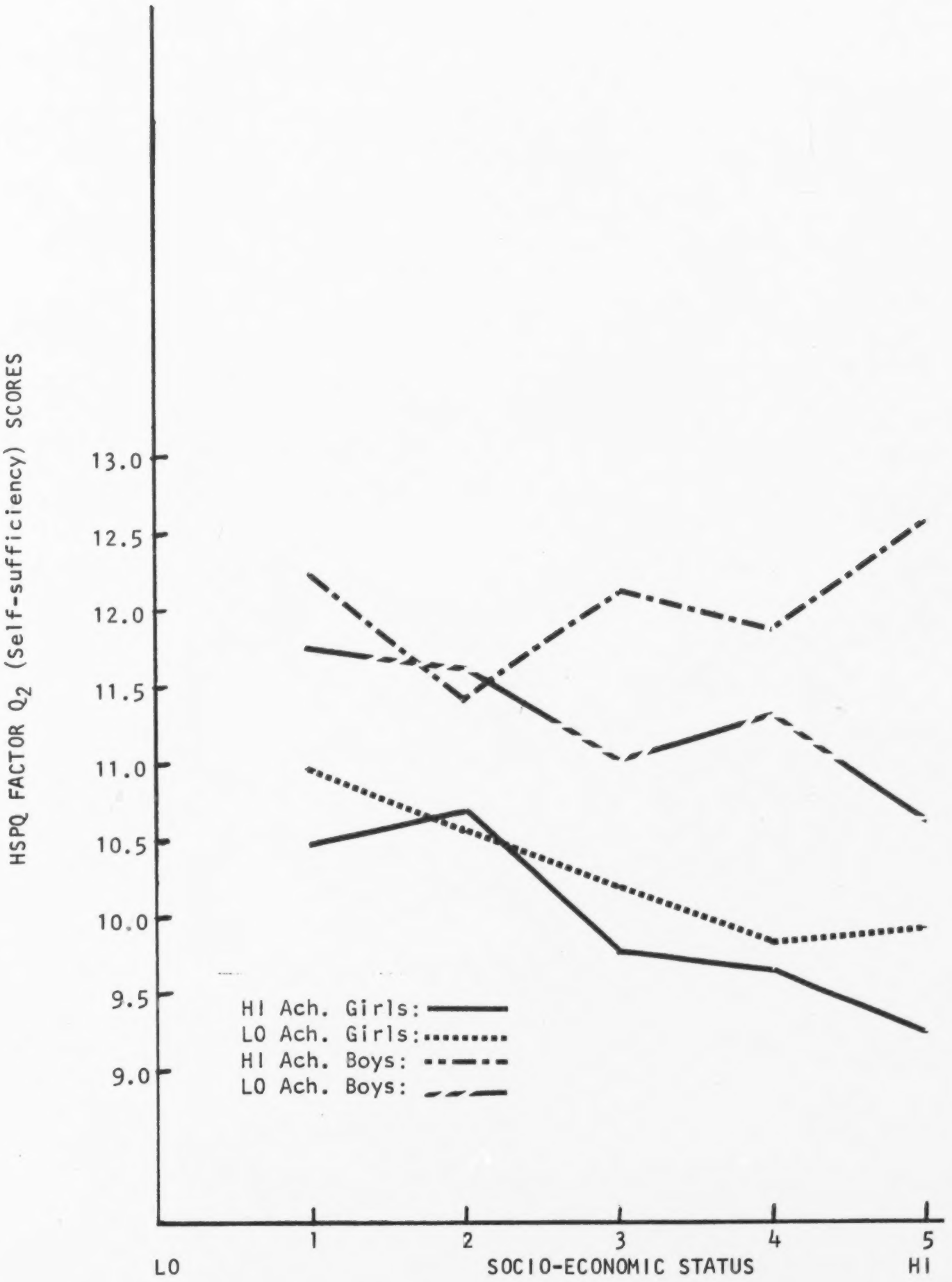

Fig. 24. HSPQ Factor Q_2 (Self-sufficiency) scores for male and female high and low academic achievers.

Willpower, Factor Q3, results are given in Figure 25. There is a significant achievement effect and a significant sex effect but no socio-economic status effect. The high achievers of both sexes and of all social levels are more controlled, socially precise, self-disciplined and compulsive while the low achievers of both sexes and of all SES levels are more careless of protocol, follow their own urges more, and are likely to have undisciplined self-conflict.

Similarly girls are more controlled, in general, than are boys. The magnitudes of the sex and achievement effects are comparable, although the effect is somewhat greater for achievement (contrast of -0.36) than for sex (-0.28).

The last of the HSPQ factors, Factor Q4, Tension, has its effects demonstrated in Figure 26. The main effect of achievement for tension is not significant while the effects for sex and for socio-economic status are. Girls tend to be more tense and driven than are the boys among this group of Puerto Rican youngsters. Boys are more relaxed and unfrustrated than are the girls. The higher SES levels are also less tense, more relaxed than are the lower socio-economic status levels.

While the main effect and all the double interactions with achievement were non-significant, the triple interaction of sex, achievement, and SES approached significance (P less than 0.002). The figure demonstrates this effect. The low achieving boys of upper social class levels are considerably more tense and frustrated than the high achieving boys of these same socio-economic levels. This effect does not appear for the girls, nor at the lower three SES levels for the boys.

A summary of the multivariate analysis of variance findings for the HSPQ personality factors is presented in Table 2. The first column of numbers are the significance levels reached for each trait in the significant triple interaction, the second column are the p values for the double interaction of achievement and sex while the third column of p values are for the main effect of achievement. The next to last column gives the discriminant function weights for each variable in differentiation high from low achievers. The last column gives the contrasts for high as opposed to low achievers. The differences between the discriminant function weights and the contrasts are that the discriminant function weights take into account intercorrelations among the HSPQ factors themselves while the contrasts do not. The discriminant function weights are similar to the standardized regression weights (beta weights)

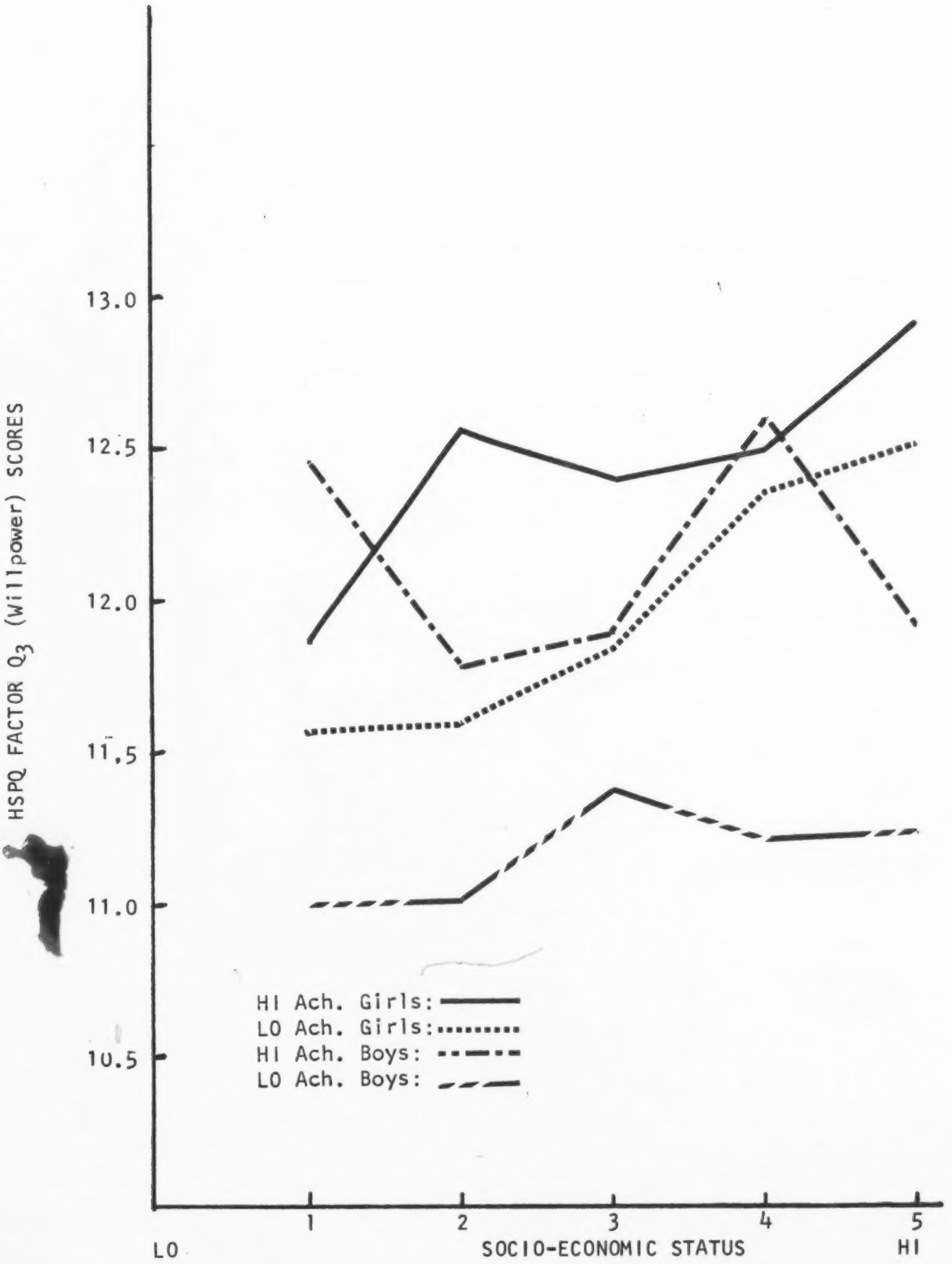

Fig. 25. HSPQ Factor Q_3 (Willpower) scores for male and female high and low academic achievers.

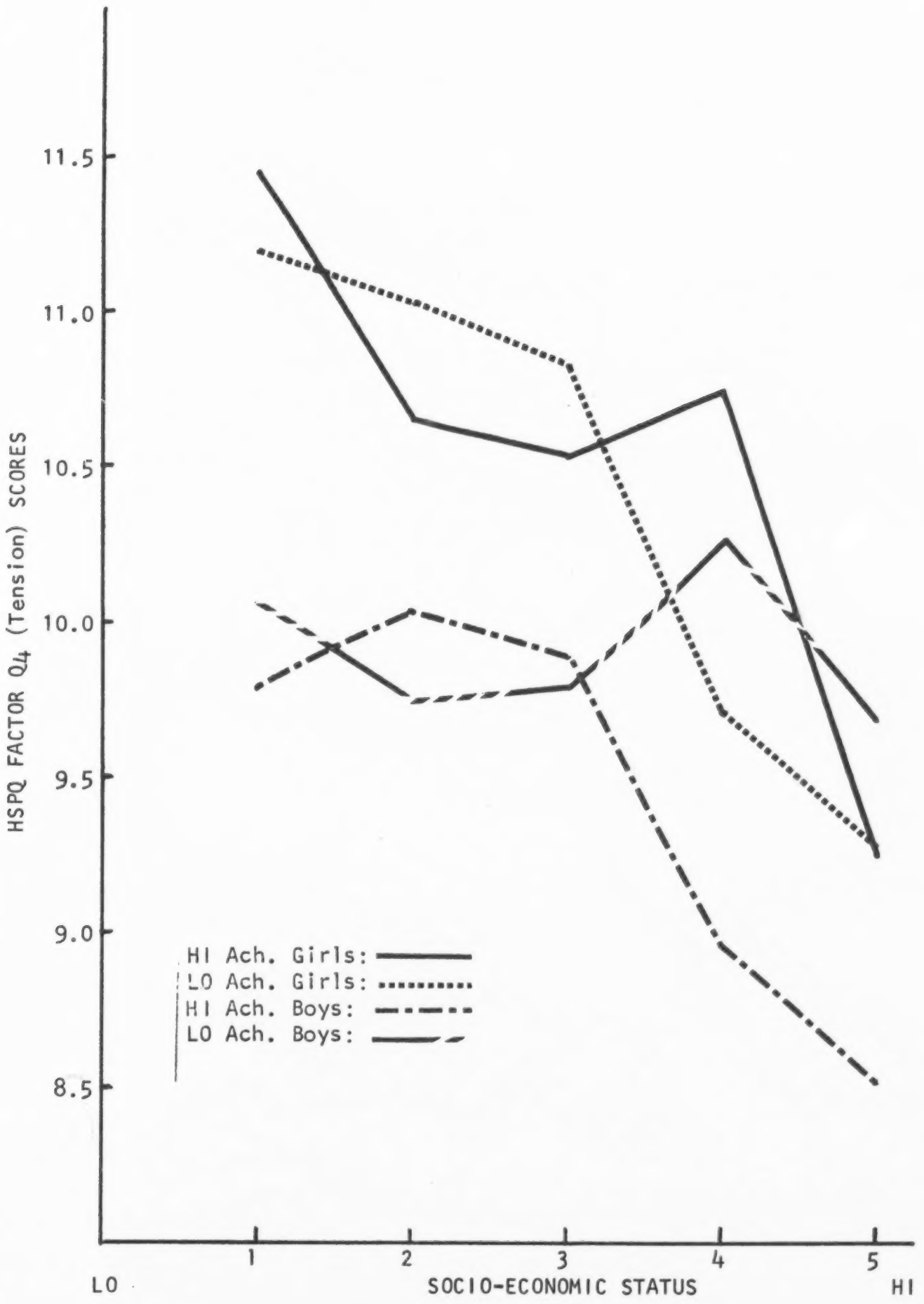

Fig. 26 HSPQ Factor Q_4 (Tension) scores for male and female high and low academic achievers.

Table 2

Summary of Multivariate Analysis of Variance Results of HSPQ Factors by Achievement, Sex, and SES

HSPQ Factor	Name	Ach-Sex-SES P value	Ach-Sex P value	Ach P value	Discriminant Function	Contrast High-Low
A	Sociability	0.009	0.127	0.081	-0.028	0.017
B	Intelligence	0.493	0.001	0.001	0.765	0.576
C	Ego-Strength	0.039	0.007	0.410	-0.250	0.071
D	Excitability	0.002	0.426	0.001	0.035	-0.290
E	Dominance	0.092	0.704	0.001	0.037	-0.203
F	Enthusiasm	0.765	0.160	0.587	0.197	-0.108
G	Conscientiousness	0.161	0.235	0.001	0.241	0.350
H	Thick-Skinnedness	0.059	0.036	0.252	-0.063	0.080
I	Esthetic Sensitivity	0.012	0.026	0.001	0.312	0.476
J	Individualistic	0.395	0.404	0.001	-0.119	-0.221
O	Guilt-Proneness	0.049	0.015	0.001	-0.209	-0.364
Q2	Self-Sufficiency	0.005	0.001	0.380	-0.005	0.111
Q3	Willpower	0.075	0.271	0.001	0.221	0.356
Q4	Tension	0.002	0.851	0.090	-0.048	-0.087

where the dependent variable was a dichotomy of high vs. low academic achievement while the contrasts are merely mean differences (actually half the mean differences) between high and low achievers controlling for sex and socio-economic status.

Turning first to the main effects, we see that the high achievers are more intelligent. This is by far the largest effect and Factor B clearly dominates the discriminant function and has the largest contrast. The Contrast effect is understated since all the other factors have a maximum score of 20 while Factor B has a maximum score of only 10. Thus Factor B's contrast of 0.576 would have to be 1.152 to be comparable to the contrasts of the other factors. Intelligence does interact with sex, and as we saw in Figure 14 the low achieving boys are considerably less intelligent than the low achieving girls, while there is no significant difference in the intelligence of the high achieving boys and girls.

Other achievement related factors are D, Excitability; E, Dominance; G, Conscientiousness; I, Esthetic Sensitivity; J, Individualistic, O, Guiltproneness; and Q3, Willpower. In brief, the high achieving student is not only more intelligent he is also less excitable, more obedient, more conscientious, more artistic and esthetically sensitive, more group minded, more placid and unworried, and more self-disciplined.

Two factors are involved in the significant double interaction between sex and achievement. Factor B, Intelligence has already been noted. The other factor is Q2, Self-sufficiency. In Figure 24 it can be seen that for middle and upper class boys the high achievers are more self-sufficient than are the low achievers. This is not so for girls nor for low SES boys. In fact, for girls there is some tendency for the high achievers to have lower self-sufficiency scores, that is to be more group dependent.

Other factors which approach significance in the double interaction are C, Ego Strength (Figure 15), and Factor O, Guilt Proneness (Figure 23).

No single factor reached the p value less than 0.001 criterion for significance in the triple interaction even though the multivariate analysis was significant at this level. However several factors approached this level of significance. These were:A, Sociability;D, Excitability; I Esthetic Sensitivity; Q2, Self-Sufficiency; and Q4, Tension. Examination of the figures for these factors generally indicate a relatively confusing picture. However three of these personality traits, Esthetic Sensitivity, Self-sufficiency, and Tension indicate that these factors are important in distinguishing high and low achieving boys among the middle and upper classes but not for lower socio-economic status boys, nor for girls at any social class level.

2. Peer Personality Rating Scales

In the present study a new method of measuring personality was used to compare with the more standard method of self-report questionnaires. It was only possible to use this method on the senior and some of the junior class at Agustin Stahl, the large public high school in Bayamón Norte. The sample size for the present analysis was 880. Not only was this sample smaller than that of the other analyses, but it was much more restricted in socio-economic level and in age. Relatively few upper and upper middle socio-economic level families send their children to this high school.

The technique involved in peer rating involves having each student in a homeroom receive a list of all the other students in his homeroom as well as a set of 42 bipolar adjectives he is to rate. Each adjective has a set of five boxes where a student can put the numbers associated with a student's name if he feels that a give student exemplifies that trait. Thus the rater indicates the five most Emotional students and the five most Calm students. Each trait is presented by name and with a short paragraph supplementing the trait name. An example is given below:

EMOTIONAL: Is always the first one to laugh at anything, or cry, or get mad. You can always tell how he feels.	vs	CALM: Doesn't laugh often, and doesn't show it when he's mad or sad - He's the same all the time.

The procedure developed by Smith (1967) was adapted to the Puerto Rican Spanish by Dr. Ena Vazquez de Nuttall. The 42 personality trait scores are obtained by summing the number of times a student was nominated by his classmates for one end of the scale minus the number of nominations for the other end. Thus with a class of 30 students, each person ends up with 42 scores ranging from -30 to +30.

Smith, in Nuttall et al (1968) factor analyzed the 42 traits and found four major factors accounting for 94 percent of the variance. After rotation to orthogonal varimax criteria the factors were

named: Agreeableness, Extraversion, Strength of Character, and Emotionality. In the analysis reported here the 42 traits were used rather than the factors.

The analysis of variance program used in these analysis will accept no more than 40 variables in the dependent variable set. In order to reduce the variables from 42 to less than 40 preliminary analyses were run and four variables which did not have any significant effects were eliminated. The remaining 38 variables were analyzed. Unlike any of the previous analyses, there was no significant socio-economic status effect. This may have been due to the restricted socio-economic range of the sample as well as to its smaller size. Significant sex and achievement effects appeared and there were significant interactions between achievement and sex and between achievement and socio-economic status.

The main effects of achievement are presented in Table 3 The figures used to present results in other analyses are not used for the Peer Personality section because of the non-significance of the socio-economic effect.

This table indicates that the high achiever generally is more adaptable, conscientious, tender, self-effacing, energetic, assertive, persevering, gregarious, self-reliant, anxious (preocupado), responsible, self-assertive, good natured, orderly, tolerant of stress, esthetically sensible, frank, talkative, conforming, considerate, mature, original, resourceful, happy, curious, admitting of mistakes, obedient, and sociable.

The most powerful of these traits are anxious (preocupado), responsible, and mature. In a multiple regression analysis predicting grade point average, Nuttall et. al. (1968) found that the Peer Personality traits could predict 29 percent of the variance of grade point averages in this sample. The major traits involved were Persistent, Anxious (preocupado), and Energetic. With the addition of five more traits the percentage of variance explained rose to 32 percent.

In understanding these results it is important to note the Spanish trait name of "preocupado" for "anxious" was used and carries womewhat different psychological meanings in Spanish than does the English trait name. Specifically, "preocupado" has overtones of careful preparation in detail for possible future dangers and has a generally positive psychological meaning. A person who is "preocupado" will always be prepared for emergencies and for possibly being called on in class.

Table 3

Main Effects of Achievement for Peer Personality Traits

Trait Pair High	Low	P less than	Standardized Discriminant	Contrast High - Low
Adaptable	Rigid	0.001	-0.061	0.633
Emotional	Calm	0.022	0.011	0.296
Conscientious	Cheating	0.001	0.055	0.448
Confident	Jealous	0.065	-0.134	0.175
Tender	Tough	0.001	0.129	0.472
Self Effacing	Bragging	0.001	0.077	0.420
Languid	Energetic	0.001	-0.216	-0.474
Assertive	Submissive	0.001	0.050	0.431
Attention Seeking	Shy	0.016	0.153	0.501
Quitting	Persevering	0.001	-0.124	-0.322
Gregarious	Self Contained	0.001	-0.213	0.457
Demanding	Patient	0.138	-0.085	0.177
Quiet	Rowdy	0.006	-0.079	0.130
Self Reliant	Dependent	0.001	0.009	0.536
Happy-go-Lucky	Anxious	0.001	-0.395	-0.444
Responsible	Not Dependable	0.001	0.395	0.922
Tense	Relaxed	0.478	-0.053	0.187
Self Assertive	Docile	0.001	0.054	0.328
Gay	Serious	0.005	0.097	0.973
Good Natured	Spiteful	0.001	0.128	0.378
Orderly	Messy	0.001	0.134	0.580
Tolerant of Stress	Not Brave	0.001	-0.126	0.159
Cooperative	Stubborn	0.917	-0.032	-0.025
Mannerly	Crude	0.215	-0.033	-0.162
Imaginative	Practical	0.673	-0.011	-0.055
Esthetically Sensitive	Nonesthetic	0.001	0.049	0.530
Frank	Inscrutable	0.001	-0.235	0.323
Talkative	Silent	0.001	0.025	0.360
Conforming	Unconventional	0.025	-0.276	0.272
Considerate	Rude	0.001	-0.011	0.406
Mature	Immature	0.001	0.290	0.415
Original	Unoriginal	0.001	0.068	0.404
Resourceful	Uncreative	0.001	0.075	0.731
Happy	Sad	0.001	0.238	0.659
Curious	Dull	0.001	0.192	0.567
Admits Mistakes	Hides Mistakes	0.001	0.204	0.259
Obedient	Not Obedient	0.001	0.044	0.517
Sociable	Unsociable	0.003	0.013	0.509

It is important to note the strength of these effects. The standard deviations for these traits range between 1.5 and 3.0 within cells. The contrast column in Table 2 indicates that several of the mean differences between high and low achieving groups will be on the order of one half to a full standard deviation. These effects are considerably stronger than all of the HSPQ factors with the exception of Factor B, Intelligence.

Table 4 presents the results for the significant sex effect. The girls were more likely to be nominated as being tender, energetic, submissive, shy,persevering,patient, anxious (preocupado), relaxed, gay, good natured, orderly, not brave, stubborn, crude, silent, immature, unoriginal, uncreative, dull, hiding of mistakes, and unsociable. Some of these sex differences are surprising. These unusual results may be due to the Spanish meanings of the traits, to the particular nature of the sample, or to the procedure itself which works with nominations rather than self-report.

There was a significant interaction between sex and achievement. Three traits were most heavily involved. The discriminant function contrasted low achieving males and high achieving females against high achieving boys and low achieving girls. Positive discriminant function weights were present for the traits of tenderness and responsibility and a negative weight for Original. This implies that the high achieving girls and low achieving boys tend to be more tender, responsible, and unoriginal while the high achieving boys and low achieving girls tend to be tough, irresponsible and original, at least as seen by their classmates.

There was also a significant interaction between achievement and socio-economic status even though there was no significant main effect for SES. On the discriminant function low achieving, low SES students are grouped with high achieving, high SES students. They are contrasted with high achievers of low socio-economic backgrounds and low achievers with high socio-economic backgrounds. Thus this function contrasts those whose achievement is "in line" with their socio-economic background which those whose achievement is discrepant with their social background. The weights on the discriminant function indicate that the students whose achievements are consonant with their SES background tend to be more assertive, yet more self-effacing, more gay and happy and more esthetically sensitive. On the contrary, the discrepant students, those who are achieving well despite their low SES background and those who are academically doing poorly despite their high SES family background are more submissive, have a greater tendency to brag, are less happy and gay and more depressed or sad, and tend not to be esthetically sensitive.

Table 4

Main Effects of Sex for Peer Personality Traits

Trait Pair High	Low	P less than	Standardized Discriminant	Contrast Girls - Boys
Adaptable	Rigid	0.018	-0.010	0.187
Emotional	Calm	0.662	0.316	0.488
Conscientious	Cheating	0.035	-0.033	0.078
Confident	Jealous	0.302	0.184	-0.038
Tender	Tough	0.001	0.489	0.568
Self Effacing	Bragging	0.613	-0.033	-0.120
Languid	Energetic	0.001	-0.184	-0.229
Assertive	Submissive	0.001	0.205	-0.242
Attention Seeking	Shy	0.001	0.089	-0.176
Quitting	Persevering	0.001	-0.057	-0.429
Gregarious	Self Contained	0.276	0.188	0.299
Demanding	Patient	0.001	-0.110	-0.358
Quiet	Rowdy	0.756	-0.156	-0.067
Self Reliant	Dependent	0.828	0.055	-0.059
Happy-go-Lucky	Anxious	0.001	-0.083	-0.575
Responsible	Not Dependable	0.003	0.139	0.255
Tense	Relaxed	0.001	-0.033	-0.201
Self Assertive	Docile	0.819	0.044	0.212
Gay	Serious	0.001	-0.155	0.271
Good Natured	Spiteful	0.001	0.235	0.246
Orderly	Messy	0.051	0.010	0.223
Tolerant of Stress	Not Brave	0.001	-0.445	-0.635
Cooperative	Stubborn	0.001	-0.064	-0.514
Mannerly	Crude	0.001	-0.369	-0.708
Imaginative	Practical	0.915	0.147	-0.014
Esthetically Sensitive	Nonesthetic	0.002	0.196	0.117
Frank	Inscrutable	0.265	-0.003	-0.116
Talkative	Silent	0.001	0.026	-0.195
Conforming	Unconventional	0.004	0.281	0.124
Considerate	Rude	0.004	-0.289	-0.399
Mature	Immature	0.001	-0.217	-0.502
Original	Unoriginal	0.001	-0.103	-0.240
Resourceful	Uncreative	0.001	-0.284	-0.322
Happy	Sad	0.019	0.125	0.064
Curious	Dull	0.001	-0.074	-0.388
Admits Mistakes	Hides Mistakes	0.001	-0.183	-0.464
Obedient	Not Obedient	0.692	0.056	-0.084
Sociable	Unsociable	0.001	-0.283	-0.331

3. Authoritarianism, Dogmatism, Anxiety, & Social Desirability

The four personality scales of Adorno et al's (1950) California F-Scale of Authoritarianism, Rokeach's (1960) Dogmatism, Sarason's (1960) Test Anxiety, and Crandall et al's (1965) Children's Social Desirability were treated in one multivariate analysis of variance. Not only were there significant main effects for achievement, sex and socio-economic status, but the two interactions of sex and achievement and socio-economic status and achievement were also significant. This means that there are differences in the personality traits associated with achievement for boys and for girls, for high and for low SES students. These effects are presented in the figures.

In interpreting the results it is useful to note that although the F-scale and Dogmatism are separate scales, they are highly correlated. The within cells correlation of Authoritarianism and Dogmatism is .76 in this analysis. The within cell correlations of either with the Test Anxiety and Children's Social Desirability were less than .25 and anxiety and social desirability correlated only -0.02.

The F-Scale Authoritarianism results are presented in Figure 27 . As can be seen, the better students are lower in Authoritarianism at all but the very lowest socio-economic status levels. At the bottom of the SES ladder there is little difference between achievement groups, but the difference there is indicates that among this lowest SES group, the high academic achievers are more authoritarian. This figure also demonstrates that at the upper SES levels, the high achieving boys are more authoritarian than the high achieving girls. For the high achieving girls, there is a very strong socio-economic status effect. The authoritarianism drops very strongly as the socio-economic level rises for these high achieving girls. The effect also exists for high achieving boys, but is not as powerful. For low achieving boys and girls, the effect is minor.

The next figure, Figure 28 , presents the data for Dogmatism. Again the better students generally are lower on this scale, that is less dogmatic, than are the poorer students. However for girls this is only true at the higher socio-economic status levels. Among the lowest SES group, as with Authoritarianism, it is the highly dogmatic girls who achieve better in school. Again for the high achieving girls there is a strong socio-economic status effect. This effect exists, but is less strong for the high achieving boys . However for the low achieving students of both sexes, the middle SES group has the highest dogmatism scores.

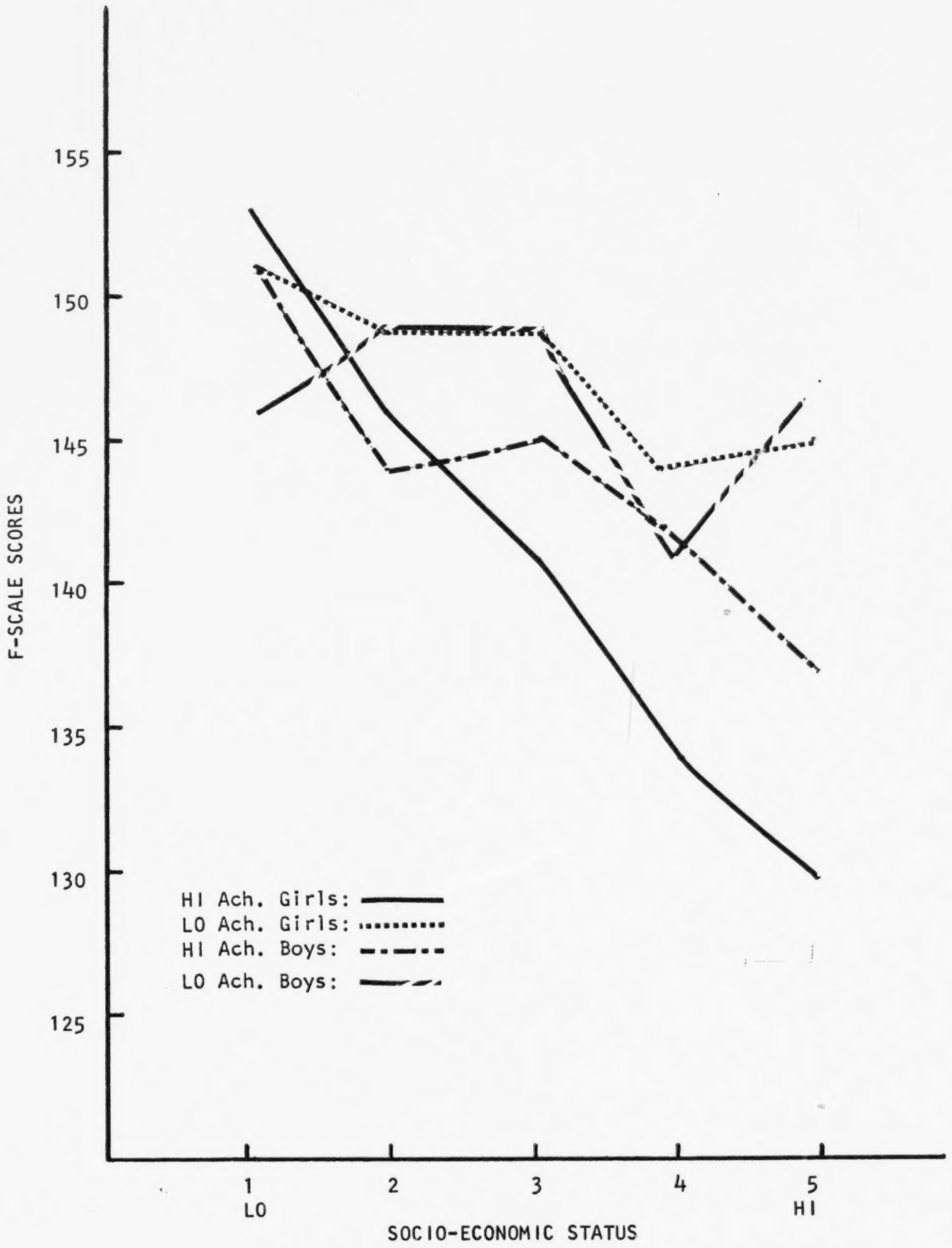

Fig. 27 F-Scale scores by socio-economic status for male and female high and low academic achievers.

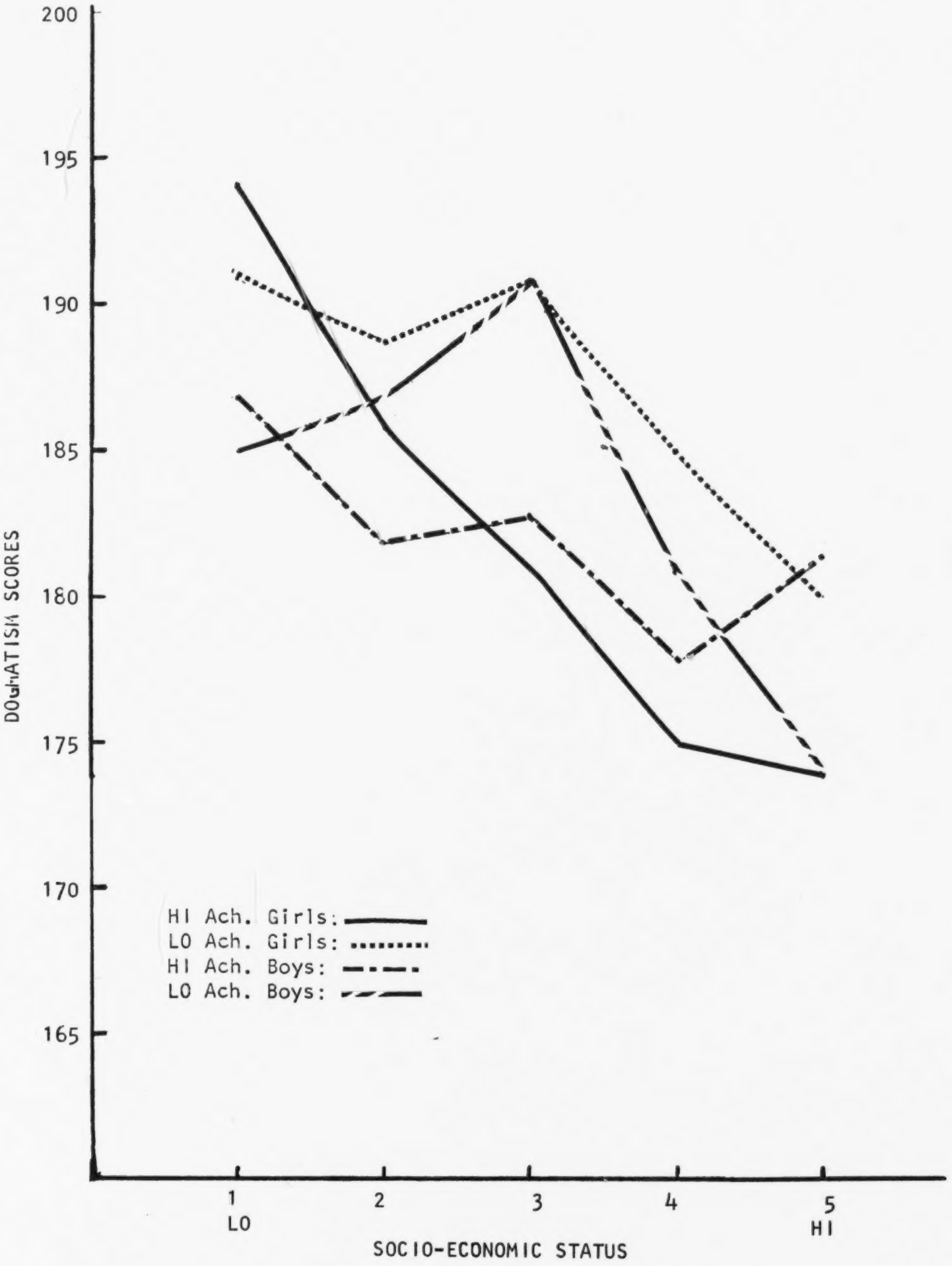

Fig.28 Rokeach's dogmatism scale scores by socio-economic status for male and female high and low academic achievers.

Sarason's Test Anxiety Scale results, presented in Figure 29, give a very different pattern. Here the sex effect is very powerful, with girls having considerably higher anxiety scores than the boys. For girls, but not for boys, the low achieving students have much higher anxiety scores. Again there is a very strong, linear socio-economic effect for high achieving girls, with the higher SES, high achieving girls having anxiety scores as low as the boys, while the lower SES girls have much higher scores. The lack of an achievement effect for boys may well be due to their general low anxiety scores. Within the range of boys' test anxiety scores, the relatively higher scores may not be sufficiently high to cause academic difficulties.

The Crandall et al. Children's Social Desirability results, as indicated in Figure 30, are somewhat similar to the test anxiety results. For girls, there is a strong effect for achievement, the poorer students having much higher social desirability scores than do the high achieving girls. For girls, there is also a strong linear socio-economic status effect with the higher SES girls giving lower social desirability scores. There is no interaction observable between achievement and socio-economic status for girls on this scale.

For boys, the situation is much more confused. For the middle socio-economic status groups, the poorer students are higher on social desirability, while at the lowest and highest end of the SES continuum the higher achievers also have higher social desirability scores. The best conclusion to make is that the social desirability scale does relate to both SES and to school achievement for girls but does not for boys.

Summarizing for these four personality dimensions, the high achieving girls are, at least for the middle and upper socio-economic groups, considerably less authoritarian and less dogmatic, less anxious about tests, and less likely to give false but socially desirable appearances than are low achieving girls. At the lowest SES level the high achieving girls are, however, more dogmatic and authoritarian than are the low achievers.

Generally none of these scales are very important in differentiating high from low achieving boys. Boys tend to be considerably less test anxious than girls, more authoritarian, and except at the higher socio-economic levels, boys also tend to have lower social desirability scores than girls.

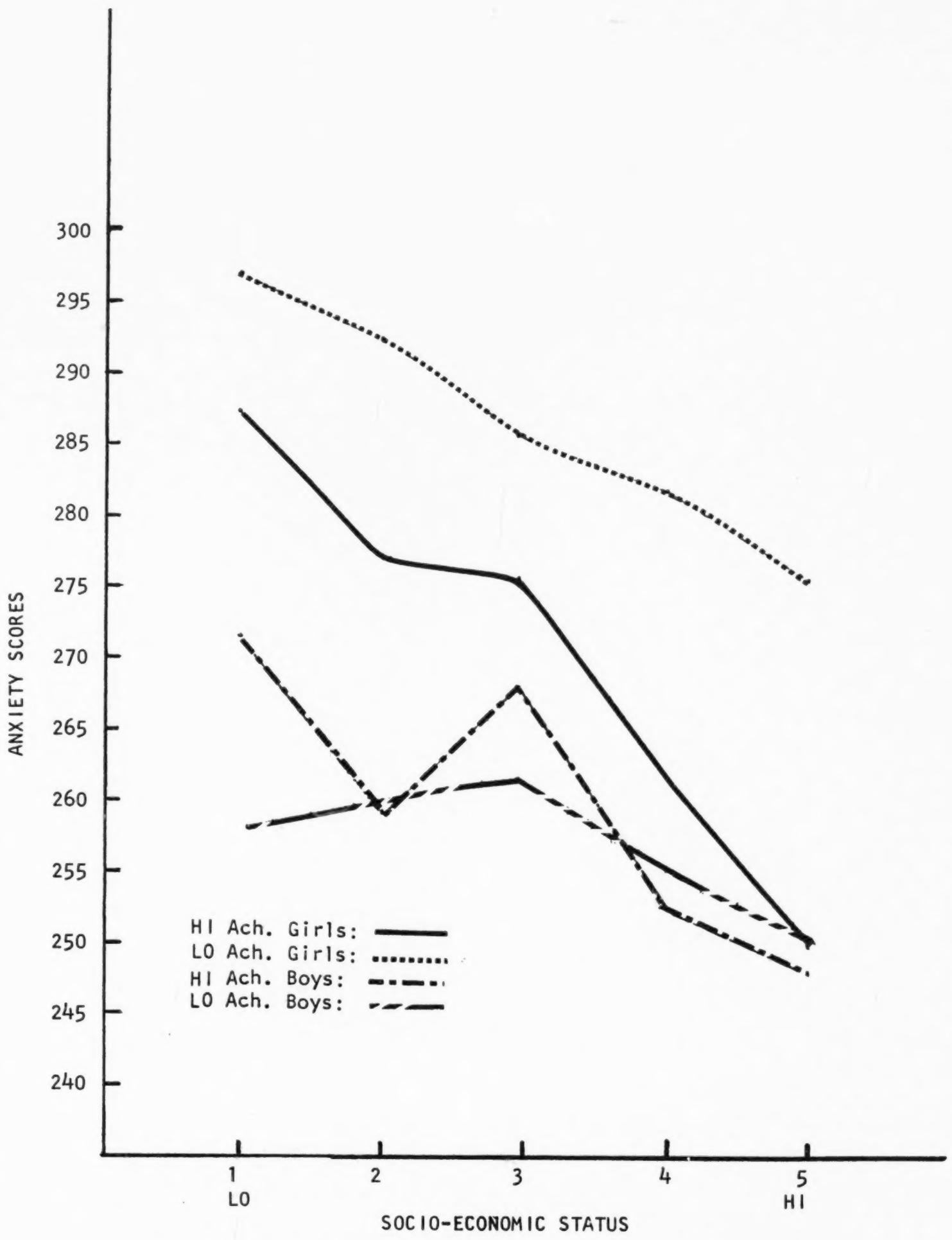

Fig. 29 Sarason's test anxiety scale scores by socio-economic status for male and female high and low academic achievers.

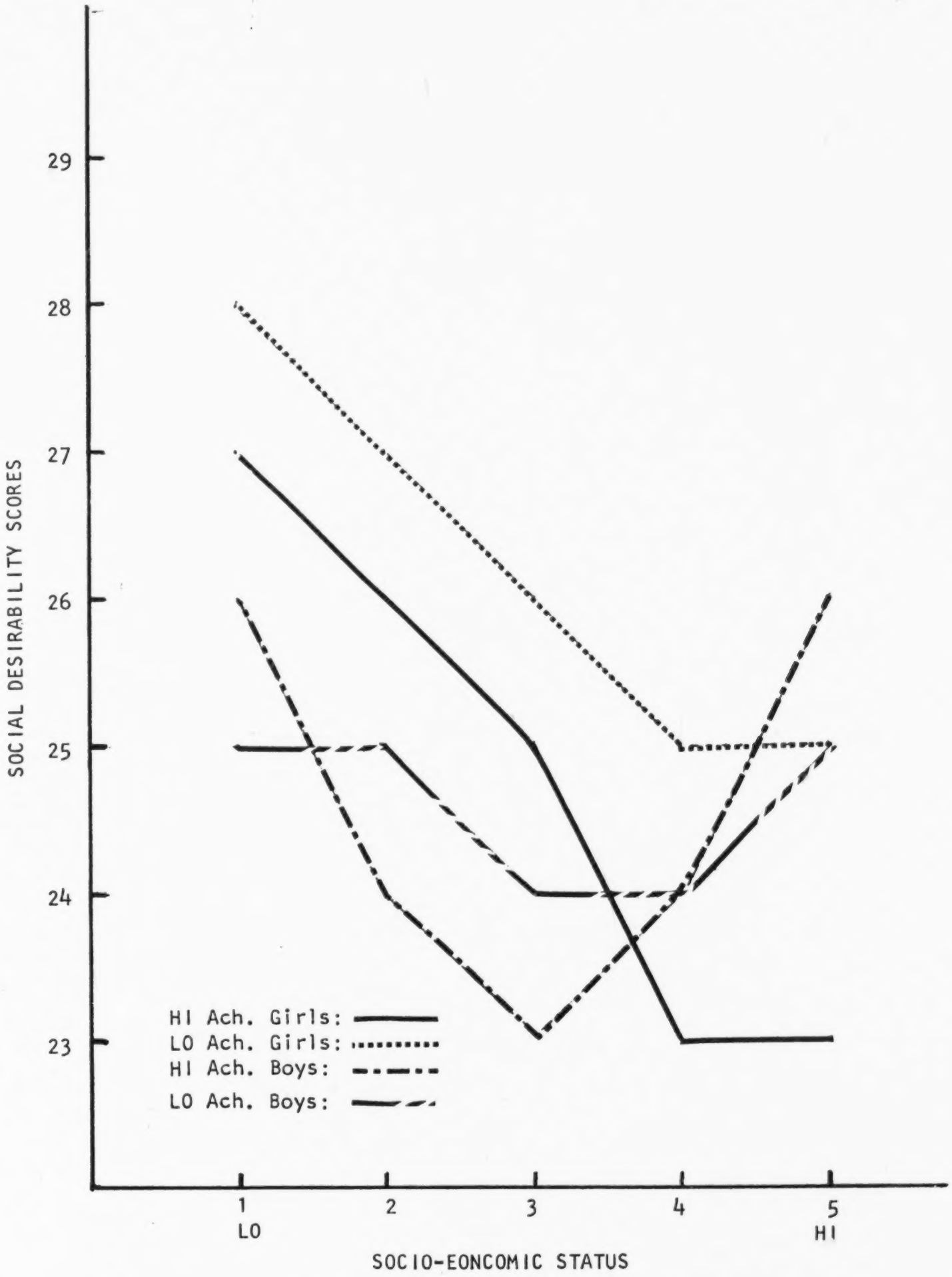

Fig. 30 Social desirability scores by socio-economic status for male and female high and low academic achievers.

C. Educational Plans

Four variables were examined in this area, occupational level desired, occupational level actually expected, commitment to attend college and degree of preference for marriage rather than college attendance. The results are presented in Figure 31 through Figure 34. The multivariate analysis of variance for these four variables found no significant interactions but significant main effects for all three classification variables, achievement, sex, and socio-economic status.

The main effect for achievement was significant for all four variables. The high achieving student, controlling for sex and for socio-economic status, was hoping for, and expecting a higher level occupation, was more committed to attending the university, and generally would not give up college to marry. The low achieving student was expecting a lower occupation, was not so committed to higher education and was more likely to indicate a willingness to give up college for marriage.

The level of occupation desired and the level of occupation expected are presented in Figures 31 and 32. These variables were derived by asking a student to choose one occupation from a long list he would most like to make his career in, or which he actually expects to work in respectively. The list of occupations and the details of the procedure are given in the Appendix. The set of occupations were classified into a seven point scale, with category 1 indicating high prestige professional and category 7 indicating unskilled. In the Figures the plots have been drawn so that high occupations are upward and lower occupations are downward, that is the ordinate runs from low occupations to high occupations.

There was a high correlation between the two measures, with a within cell correlation of 0.81 between occupational level expected and occupational level desired. All three main effects are apparent in Figures 31 and 32. The high achieving students desire and expect higher level occupations. Boys generally expect higher occupations than girls. The higher the socio-economic level of the family from which the students come, the higher the occupational level they are aiming for.

In size of effect, the SES effect is by far the largest, with the contrasts indicating that from the bottom to the top of the family SES levels, the aspired to occupational levels range 1.07 units on a seven point scale while the range is 1.20 for occupational expectation. The sex effect range was 0.81 for occupational aspiration and 0.68 for occupational expectation. The achievement effect was only 0.34 for occupational aspiration and 0.50 for occupational expectation. Thus while students who are achieving well in school, controlling for sex and family background, do aspire to higher occupations, this aspiration is

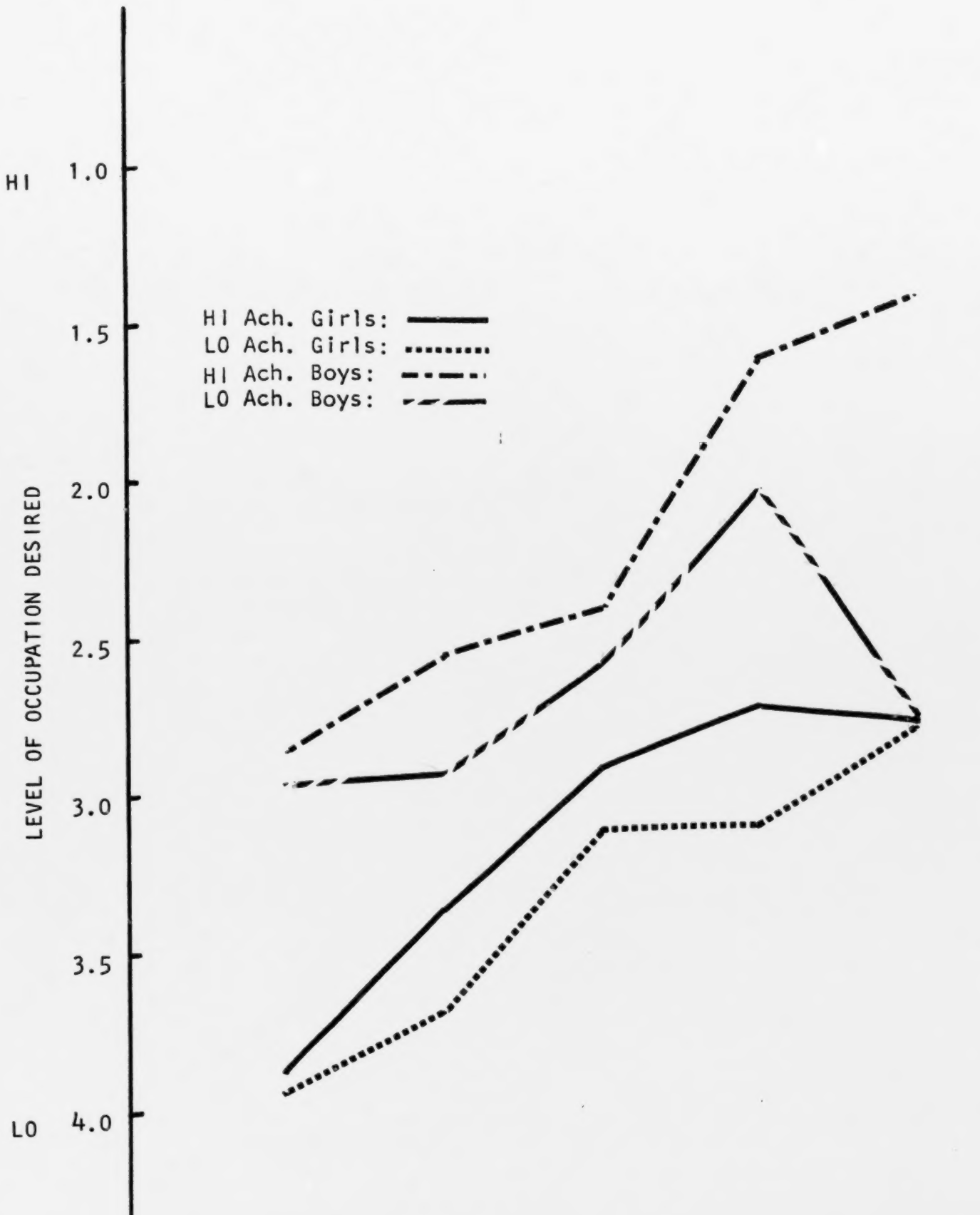

Fig. 31 Level of occupation desired for male and female high and low academic achievers.

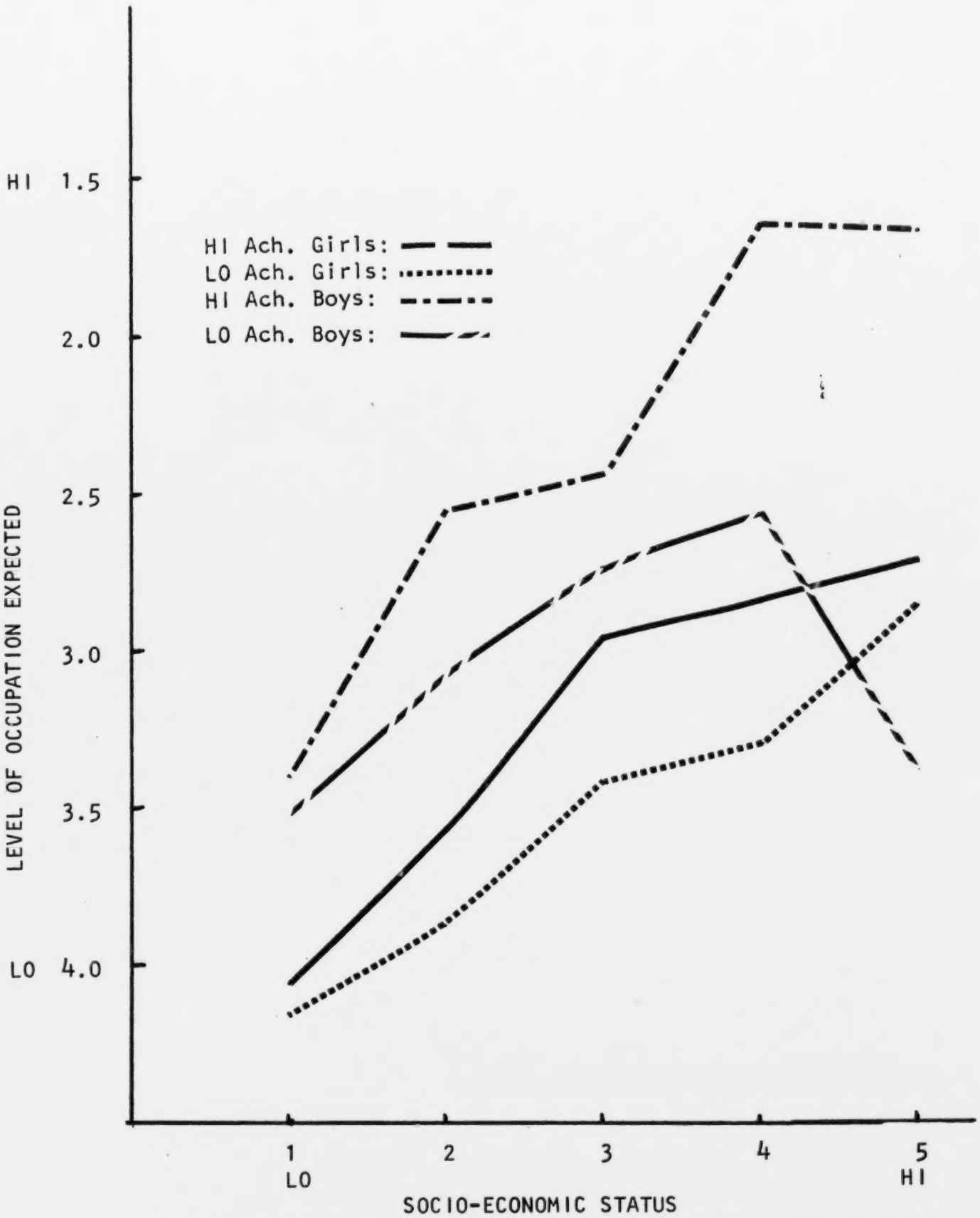

Fig. 32 Level of occupation expected for male and female high and low academic achievers.

influenced by achievement only about half as much as it is affected by the student's sex and only about a third as much as it is affected by his socio-economic status.

While the effect is not significant, the two figures do demonstrate an interesting phenomena for the low achieving but high socio-economic status boys. They are aspiring to occupations considerably lower than are the high achieving boys of similar very high SES and are actually expecting occupations lower than girls of their socio-economic background. What may be going on here is that these boys realize that their academic low performance will preclude the occupations such as lawyer, dentist, physician, and college professor which high achieving boys of the same high socio-economic bacground are aspiring to.

Again while the effect is not significant, at the very lowest family socio-economic levels, the effect of academic achievement is smaller than it is at higher SES levels.

The degree of committment to going to college was measured by a question asking "When do you plan to start college?" The answers were coded so that "0" meant planning to start college right after high school, "1" meant planning to start after military service, "2" meant planning to go to college after working for a few years, "3" meant indefinite plans about going or not going to college and "4" meant planning not to go to college. The results are presented in Figure 33.

There is a marked socio-economic status effect and an achievement effect but the sex effect is non-significant. As expected, the higher achieving students are more likely to plan to go to college than are the low achieving students. Controlling for sex and family SES background, the effect of high vs. low achievement is 0.80 on the scale discussed above. However the family socio-economic background effect is considerably larger than the achievement effect, with the difference between the lowest and highest SES levels, holding constant sex and achievement is 2.01 on the above scale. In general low SES girls, even those who are doing well in school, do not plan to go on to college. Low socio-economic background boys, even when they are achieving academically, generally plan to go to college only after working for a few years.

The lack of a sex effect was surprising. On the above scale the size of the non-significant (p level 0.084) was only 0.29 with boys slightly more interested in college than girls.

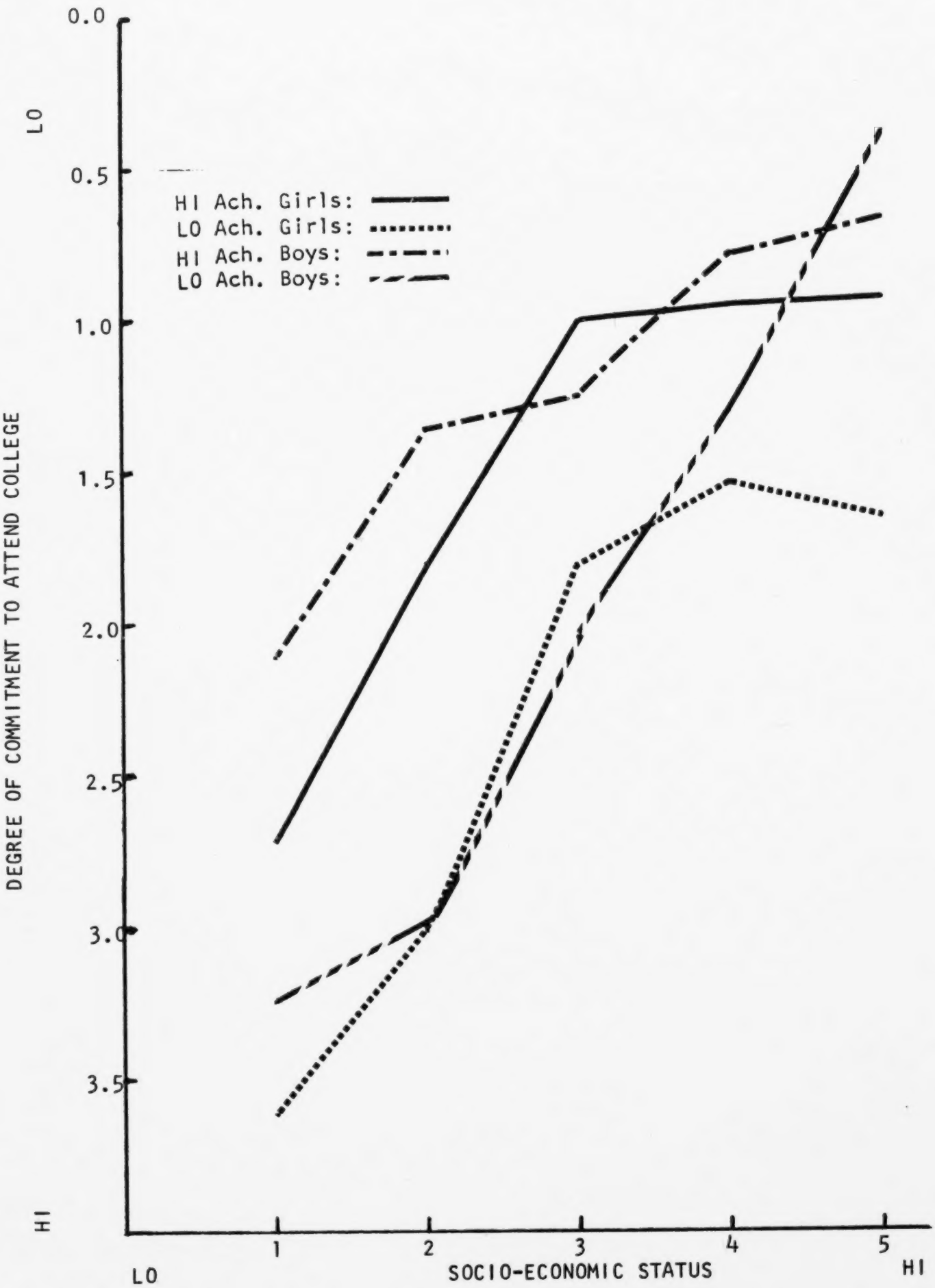

Fig. 33 Degree of commitment to attend college for male and female high and low academic achievers.

In Figure 34 the results are presented for an index of preference for marriage rather than attending college. The question asked "Would you prefer to get married rather than go on to college?". The answer categories were "Yes", coded as a "1"; "Don't know", coded as a "2"; and "No", coded as a "3". Again surprisingly, there was neither a significant sex effect, nor a significant socio-economic background effect. There was, however, an achievement effect. Low achievers, of both sexes and across all SES levels, have a somewhat greater tendency to prefer marriage to going on to college. It should be noted, however, that the great majority of all students, even those of low achievement levels, either "Don't know" or prefer to go to college. Very few say they plan to give up college in order to marry.

It had been predicted that the low achievers from high socio-economic status backgrounds would tend to show fairly high aspirations while low achievers from low status backgrounds would not. The situation is more complex than this prediction. First, as demonstrated in Figures 31 and 32, low achieving boys from the very highest SES backgrounds actually had relatively low occupational aspirations and expectations, in fact their aspirations were at about the same level as the low achieving boys from the lowest SES levels. However, the prediction did hold when the average and above average SES level low achieving boys were compared to the lower socio-economic background low achieving boys. Moreover, for girls, the prediction held at all SES levels. While there is an anomalous effect for highest status, low achieving males, the major effect of the prediction holds.

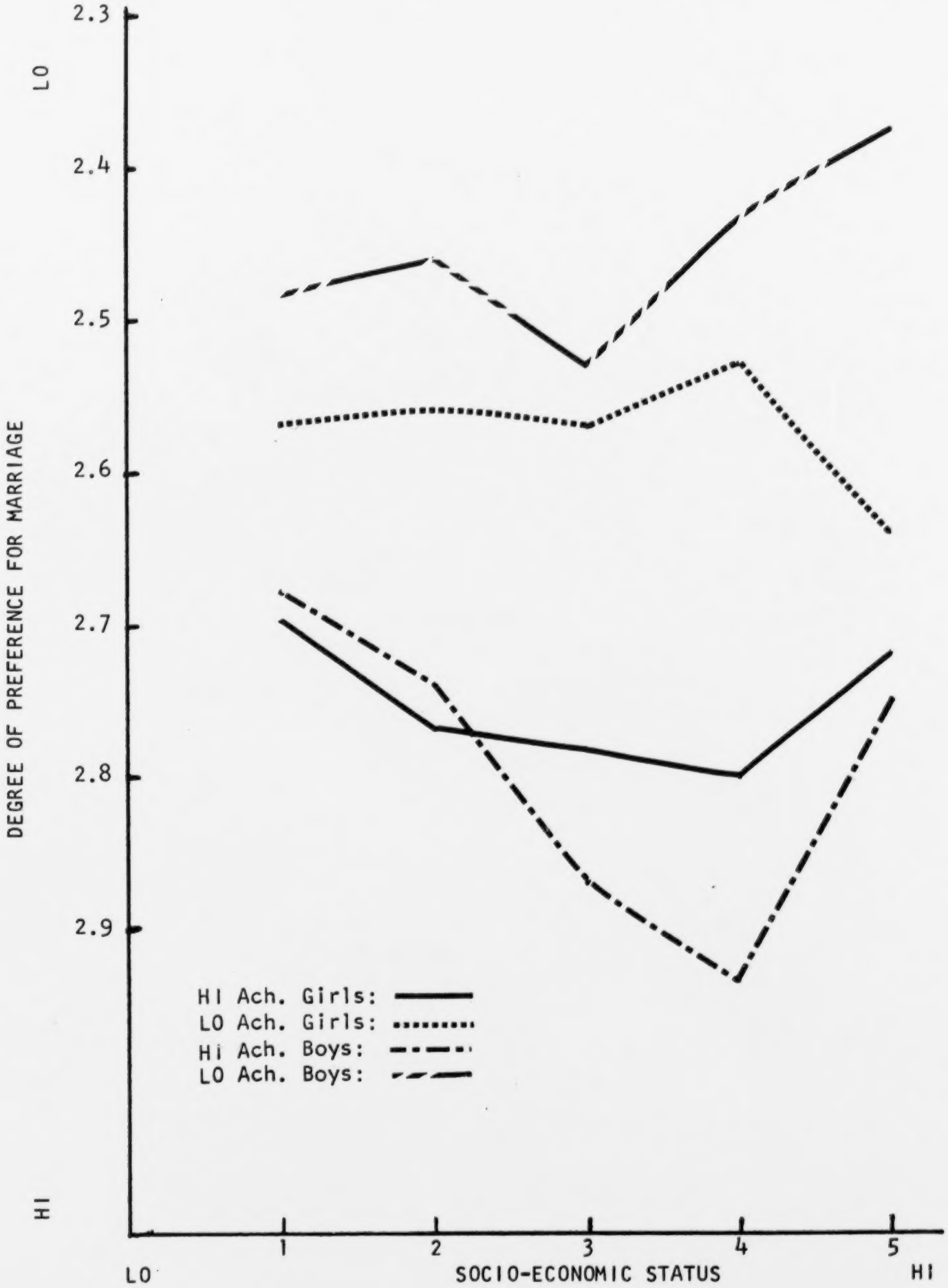

Fig. 34 Degree of preference for marriage rather than attending college for male and female high and low academic achievers.

D. Self Concept

A question to measure self concept asked: "How bright or intelligent do you think you are in comparison with the other students in your grade?" Answers were coded as follows: (1) Among the brightest, (2) Above average, (3) Average, (4) Below average, and (5) Among the lowest. Previous research work had indicated that high school students were different in self concept than were junior high school students so in this analysis school level (junior or senior high school) was treated as an additional classifying factor in the analysis of variance. Further it was felt that there might be a relationship between self concept with respect to intelligence and measured intelligence. Hence an analysis of covariance was run, covarying out HSPQ Factor B, Intelligence. In fact there was no relationship between these two measures and the within cell correlation between self concept and HSPQ B was 0.00.

The results of self-concept for high school students are presented in Figure 35 and for junior high school students in Figure 36. For the high school students there was a very clear effect for achievement, for sex, and for socio-economic status. The high achieving students felt themselves to be more intelligent than low achieving students. Boys felt themselves to be brighter than girls, and high socio-economic status students felt themselves to be more intelligent than students from lower SES backgrounds.

The same general phenomena appear for the junior high school students in Figure 36. However, for the high school students the high socio-economic background students are somewhat more spread out in terms of the sex and achievement effects than are the low SES students. This is strikingly not the case for the junior high students. For these younger students achievement and sex effects are quite powerful for the lower SES students but become of little importance for the higher SES students. At the junior high school level socio-economic status is more important than achievement for those who have high status.

Comparing high school students with junior high school students, there is a general tendency for the students with high achievements at the high school level to think better of themselves than do students who are doing well academically at the junior high level. Conversely the students who were not doing well academically at the junior high school level did not think too poorly of themselves, while at the high school level they did. In brief, academic achievement became more important to self concept for high school students as compared to junior high students.

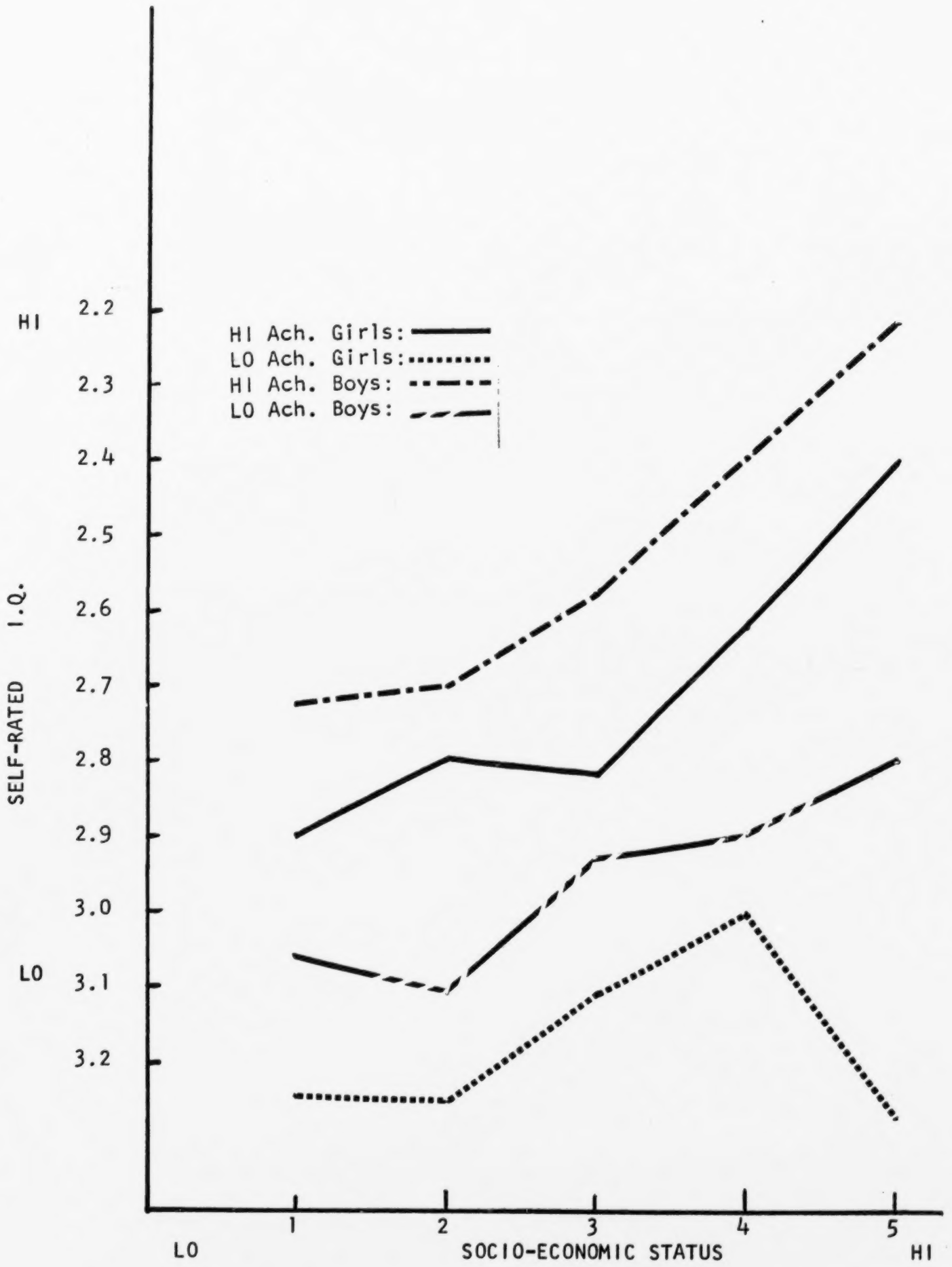

Fig. 35 Self-rated I.Q. by socio-economic status for male and female high school students who are high and low academic achievers.

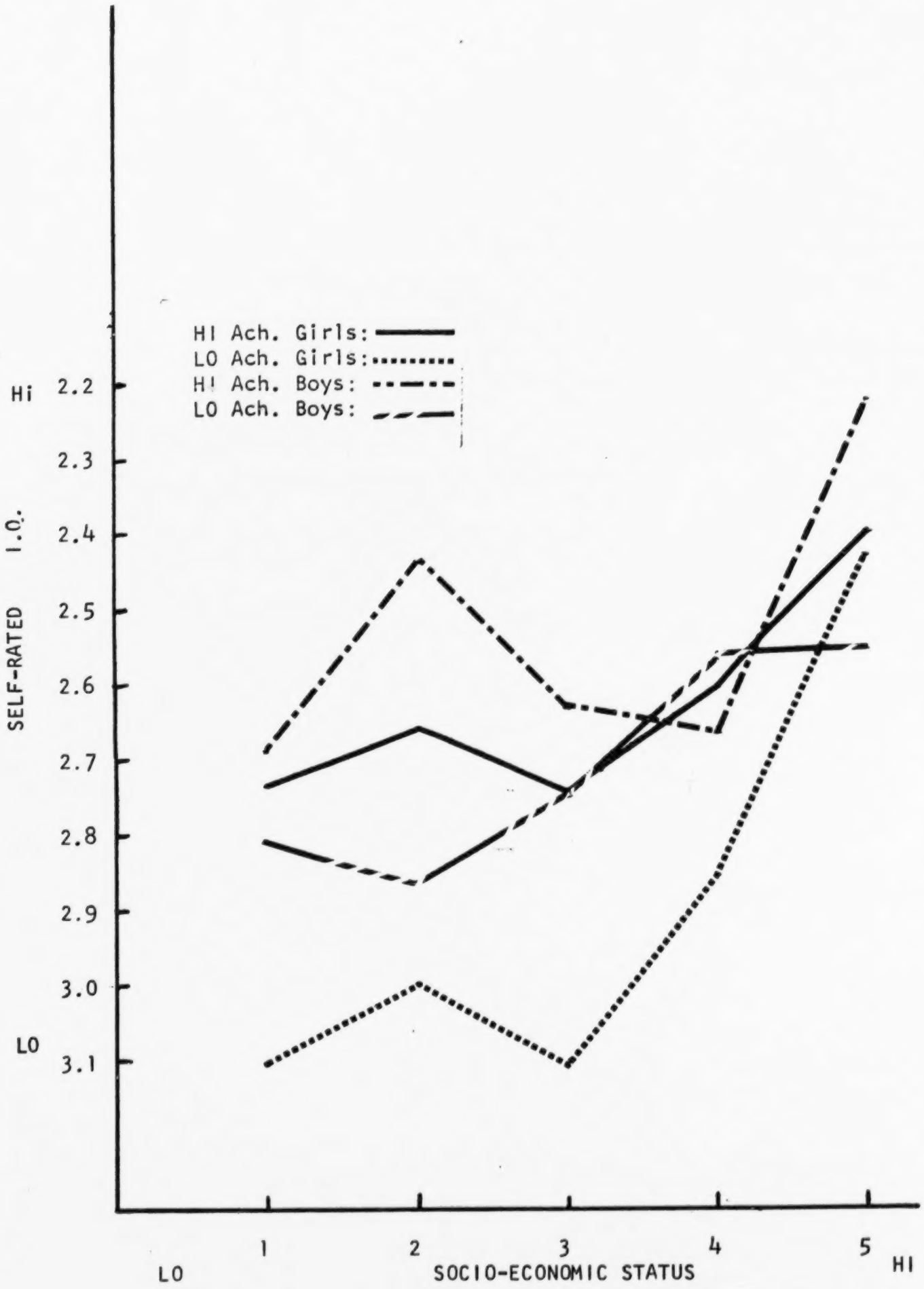

Fig. 36 Self-rated I.Q. by Socio-economic status for junior high school male and female high and low academic achievers. A low score on the I.Q. measures indicates a high self-rated I.Q.

E. Peers

It was predicted that the high achieving student should have more friends in school and belong to more clubs and organizations. Students were asked to write in the names of up to five best friends. They were then asked how many of these friends attended the same school. This "number of friends in school" was an index of how well the student was integrated into his school. The results for this variable are presented in Figure 37. The analysis of variance results indicated that there were no main effects for any of the classificatory variables. However the achievement effect was near significant, with a p value of 0.013. From the figure there does seem to be a tendency for the high achieving students to have fewer friends in school than do the low achievers.

A question was asked about the number of non-athletic clubs and organizations in school the student belonged to. The results for this variable are given in Figure 38. There was no significant effect for either achievement or for socio-economic status. However there was a significant sex effect. Girls belong to more clubs and organizations, on the average, than do boys. This effect holds for low and for high socio-economic status girls and for high and low achieving girls.

In short, the predictions that the high achieving students would have more friends in school and belong to more clubs there was found to be only partially supported for friends in school and not supported for the number of clubs and organizations.

F. Study Habits

It was predicted that students who are high academic achievers would spend more time each week doing homework. The results are given in Figure 39. The analysis of variance found none of the effects significant at the 0.001 level. There was some indication of a sex by achievement interaction (p less than 0.074) and some indication of a main effect of achievement (p less than 0.071). However, examination of the figure leads to no obvious conclusions and the best summary is that the prediction was not upheld. There is no evidence that high achieving students in fact study more, as the variables were defined in the present study.

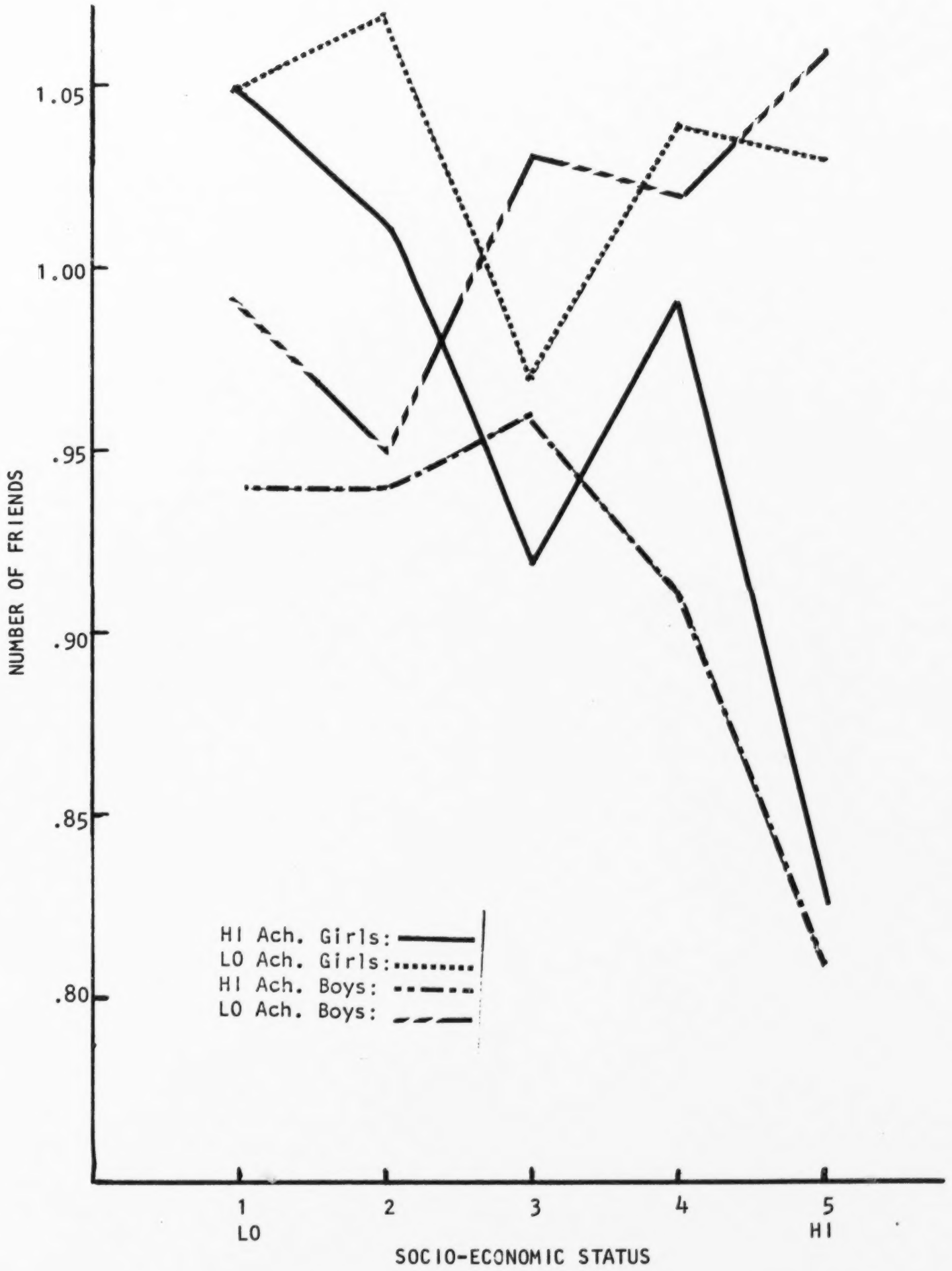

Fig. 37 Number of friends in school for male and female high and low academic achievers.

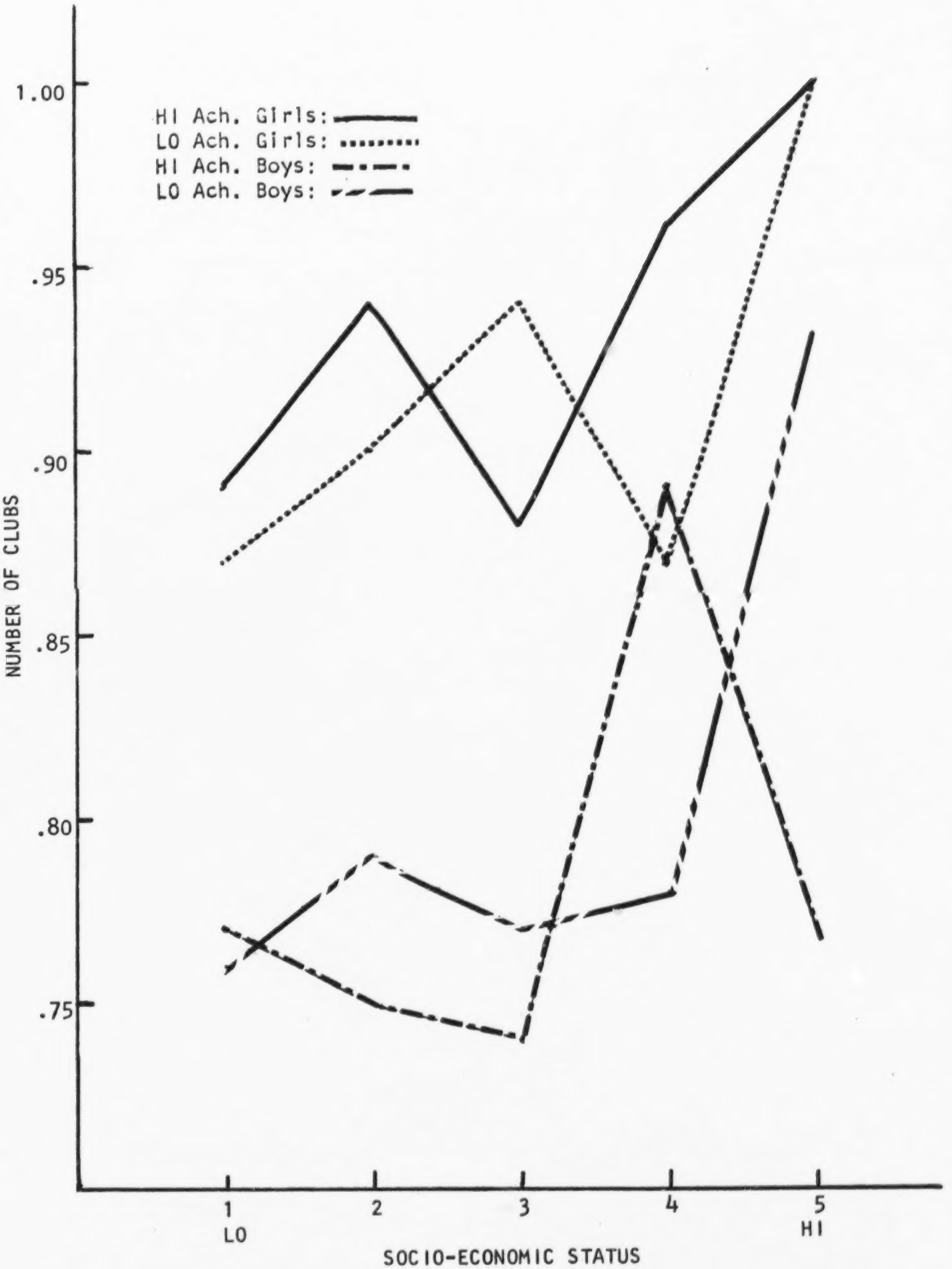

Fig. 38 Number of clubs and organizations for male and female high and low academic achievers.

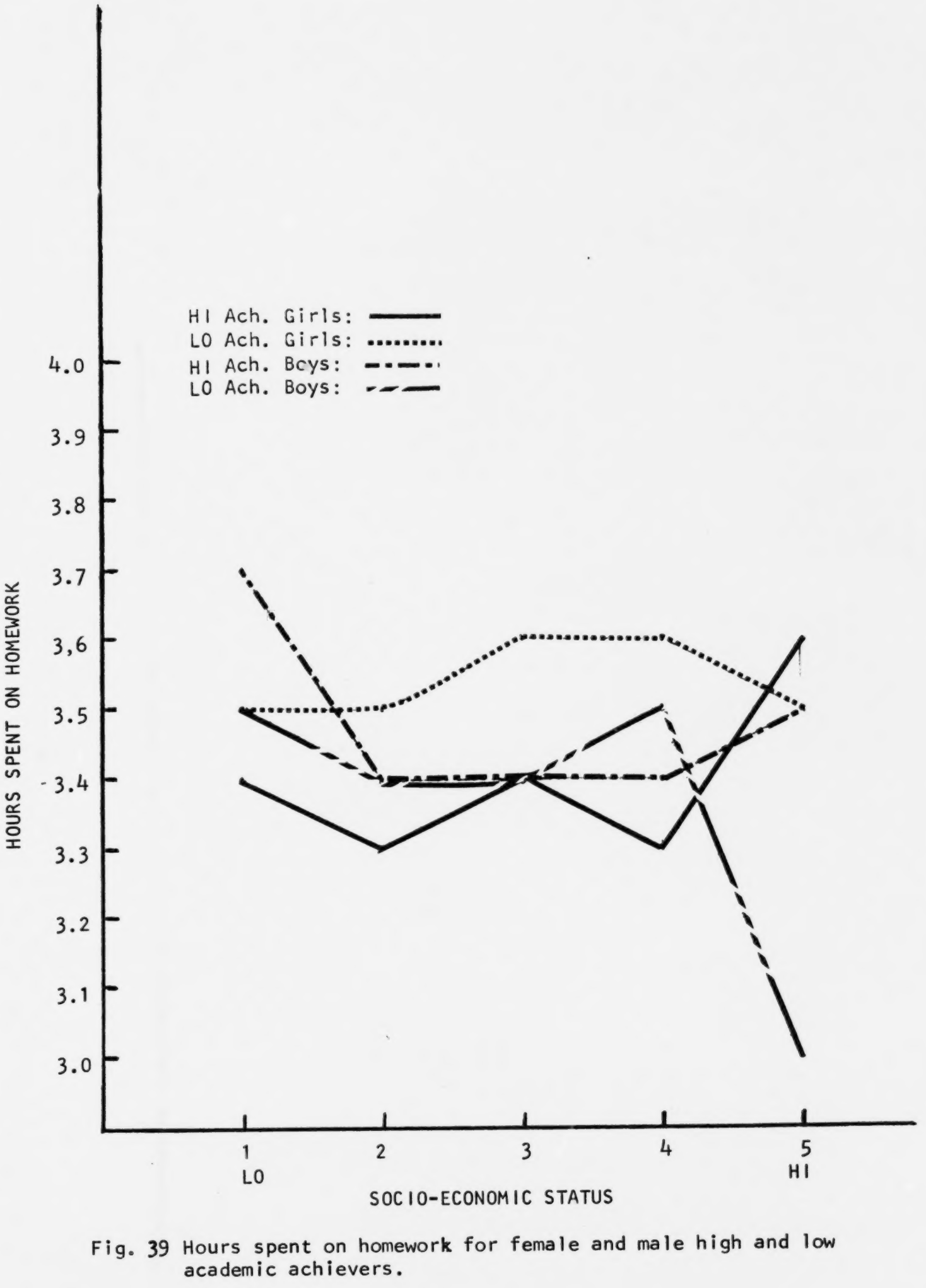

Fig. 39 Hours spent on homework for female and male high and low academic achievers.

G. Attitudes Toward School

It was predicted that high achieving students, especially those from a low socio-economic background, would have a more positive attitude toward school and be less interested in quitting school and going to work than are low achieving students.

A variable indicating a like or dislike of school was derived from a question "When I leave school and start working, I wish that the place where I work is (1) Exactly like school, (2) No answer, or (3) Altogether different from school". The results are given in Figure 40. The analysis of variance indicates a significant achievement effect, a significant sex effect, and an effect for socio-economic status which approaches significant (p less than 0.008). The interaction between sex and achievement also approaches significance (p less than 0.004).

The high achieving students have a much greater hope that work will be just like school than do the low achieving students. For low achieving students, the boys dislike school more than do girls. The socio-economic tendency is for higher status students to like school more than do lower status students.

The Tannenbaum Attitude Toward School scale consists of about twenty items. The higher the scale score, the more school is disliked. The results for this index are presented in Figure 41. There were significant main effects for achievement, sex, and for SES and a tendency (p less than 0.019) for there to be an interaction between sex and achievement. Again the academically proficient students have a more positive attitude toward school. Girls are more in favor of school than are boys and higher socio-economic background students feel more positively toward school than do those from lower social backgrounds. The low achieving boys, regardless of their socio-economic status, have a less favorable attitude toward school than the more academic proficient and also a less favorable attitude toward school than low achieving girls.

The prediction that attitudes toward school would be especially positive for the high achieving students from low SES backgrounds was not upheld. There was not even a tendency for there to be an interaction between socio-economic status and achievement.

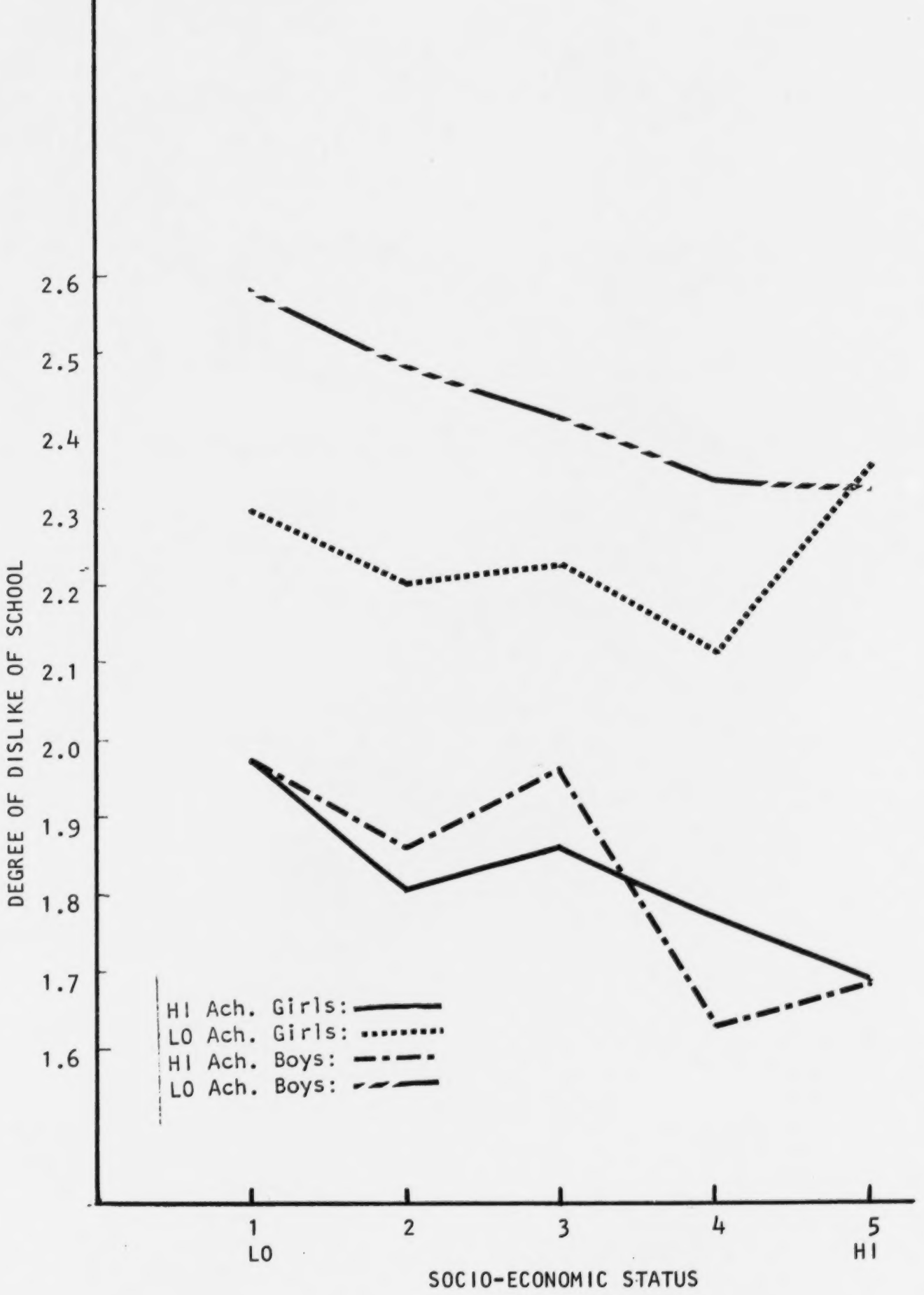

Fig. 40 Degree of dislike of school for male and female high and low academic achievers.

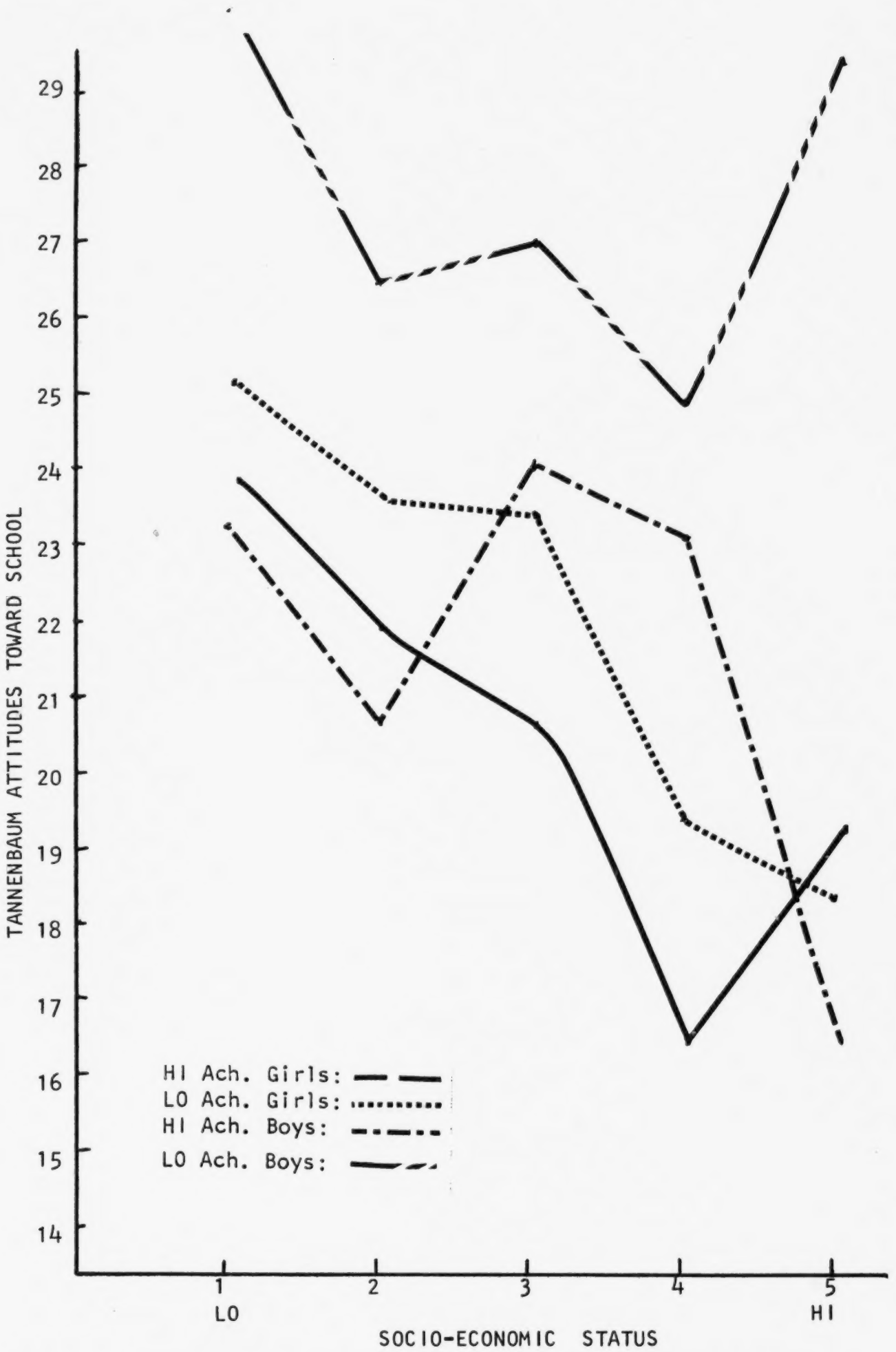

Fig. 41 Attitudes toward school (low score = positive attitude) among male and female high and low academic achievers.

CONCLUSIONS

The basic question involved in this research was to what extent the factors related to academic achievement differed for students of high and low socio-economic background and of different sexes.

In terms of family background there were no statistically significant interactions. This indicates that the same factors were important for academic achievement for both boys and girls and for students from all socio-economic status levels.

In general, the high achieving student tended to come from a family who was geographically mobile, had somewhat fewer children in the family, and had slightly more space per person in the home. The student who was a low achiever tended to come from a non-mobile, larger, and more crowded family.

There were major socio-economic effects on family size, geographic mobility and space. Parental education is part of the definition of socio-economic status and is naturally massively related to it. However within each SES category the achieving students tended to have slightly more educated fathers and very slightly less well educated mothers than the low achievers.

In the parent-child relationships realm again there were no significant interactions so those parent child patterns most conducive to academic achievement hold for both sexes and at all socio-economic status levels. The students who were succeeding in their academic work tended to come from families where the mother strongly Accepted the child and where both parents did not use Hostile Psychological Control methods on the child to any great extent. The family of the high achieving child tended to pay attention to him while the low achieving child's parents were likely to discipline him only very laxly and to ignore him much of the time.

The personality realm was measured with three sets of instruments, the Cattell High School Personality Questionnaire (HSPQ), a peer nomination technique to measure personality traits, and a set of scales measuring Authoritarianism, Dogmatism, Test Anxiety, and Social Desirability.

In the HSPQ realm there were significant interactions. This indicates that the personality traits associated with academic success did differ somewhat by sex and by socio-economic background. Low achieving boys as contrasted both to high achieving boys and to both high and low achieving girls, were markedly less intelligent (Factor B). A similar pattern existed for the trait of conscientiousness (Factor G) where again the low achieving boys were markedly

In the peer measures there was no main effect for socio-economic background but there was a significant interaction beteen achievement and SES. This interaction indicated that students whose academic achievement was consistent with their socio-economic status were different in their personalities from those students who were discrepant between their achievements and social background. That is high achieving, high SES students were consistent, while low achieving and low SES students were also consistent. The discrepant group included both high achieving students from a low SES background and low achieving students from a high socio-economic status family.

The findings indicate that the consistent students tended to be more assertive, yet less bragging, more gay and happy and more esthetically sensitive while the discrepant students had a greater tendency to be submissive, to be braggers, and were less happy and more depressed or sad. The discrepant students also tended not to be esthetically sensitive.

The peer measured personality traits which were important for distinguishing academic achievers from academic non-achievers indicated that the high achiever generally was more adaptable, conscientious, tender, self-effacing, energetic, assertive, persevering, gregarious, self-reliant, anxious (preocupado), responsible, self-assertive, good natured, orderly, tolerant of stress, esthetically sensible, frank, talkative, conforming, considerate, mature, original, resourceful, happy, curious, admitting of mistakes, obedient, and sociable. Of these many traits, the most important were anxious (preocupado), responsible, and mature.

In the area of Authoritarianism, Dogmatism, Text Anxiety, and Social Desirability there were significant interactions. The girls of higher socio-economic status who were high achievers tended to be less Dogmatic, less Authoritarian, less Test Anxious and lower on Social Desirability. For boys only the Authoritarianism and Dogmatism scales were significant and their effect was much smaller than for the girls. Hence these traits were important in discriminating high and low academic achievers only for middle and higher SES girls.

In the educational plans areas there were no significant interactions. The main effect for achievement indicated that students who were doing well academically desired and were expecting higher status occupations than those who were not doing well academically. The low achieving student was expecting a lower level occupation, desired a lower occupation, was not as committed to obtaining a college education and was slightly more willing to give up college in order to get married than was the high achieving student. These effects held for both sexes and across socio-economic status levels.

Self-concepts were higher for higher achievers than for low achievers. At the junior high school level lower SES students had their self-concept strongly affected by both achievement and sex but upper socio-economic background junior high school students differed little in self-concept by their achievement level or sex. However at the senior high school level achievement status strongly related to self-concept at all SES levels and the effect was somewhat stronger at the upper SES background levels than at the lower. At the junior high school level the prediction that achievement status would more strongly affect self concept than it would at upper SES levels was upheld. This prediction was contradicted at the high school level.

In the peer area there were no significant interactions and there was only a tendency (p value p.013) for high achieving students to have more friends in school. There was no significant relationship between achievement and the number of clubs and organizations a student belonged to.

Contrary to predictions, there was no evidence that high achieving students in fact study more than low achieving students.

Attitude toward school was the last area examined. For low achieving students, boys disliked school more intensely more than girls. High achieving students liked school more than low achieving students but among there there was no sex difference.

In conclusion there <u>do</u> seem to be somewhat different patterns in personality traits associated with achievement by sex of the student and his socio-economic level. On the whole, however, in this study, these special patterns were not as important as the consistencies. Generally those factors associated with high academic achievement held for both sexes and across all socio-economic levels.

deficient in conscientiousness. These low scores for intelligence and conscientiousness for low achieving boys held at all socio-economic levels.

There was another special pattern which existed in the HSPQ data. For high social status boys, there was a difference between high and low achievers in the traits of ego-strength (Factor C) and tenseness (Factor Q_4). The low achieving boys of high social status were much more tense and much lower in ego-strength than were the high achieving boys of the same high socio-economic background. These traits did not differentiate among low social background boys nor among girls in terms of their academic achievement.

For one trait, self-suffieiency (Factor Q_2), the direction of effect for academic achievement was opposite for the two sexes. High SES, high achieving <u>boys</u> were more self-sufficient and less group dependent than were the high SES, low achieving boys. For <u>girls</u>, the tendency was for the more group dependent, less self-suffieient girls to get better grades. The low achieving girls tended to be more self-sufficient. This trait, as with ego-strength and tenseness, made little difference in the achievement of low socio-economic background boys.

There were quite a few personality traits which were consistent in their implications, that is these personality traits helped academic achievement for a student regardless of the sex or the socio-economic background of the student. The most important HSPQ trait for achievement, as migh be expected, was Intelligence. The more intelligent students were better students. Other personality traits related to high achievement indicated that the high achieving student tended to be less excitable, more obedient, more conscientious, more artistic and esthetically sensitive, more group-minded, more placid and unworried, and more self-disciplined.

Turning to the peer personality technique for measuring personality traits, there were also significant interactions. An interaction between achievement and sex indicated that high achieving girls and low achieving boys tended to be more tender, more responsible, and less original, while the high achieving boys and the low achieving girls tended to be tough, irresponsible, and original.

RECOMMENDATIONS

This study was conducted in the Bayamón Norte school district in Puerto Rico. Many of the findings have also been found to hold for American students in the U.S. It should be noted that Puerto Rican students in the continental U.S. have the added difficulty of being instructed in English while their native language is Spanish.

This study demonstrated two major phenomena. First most factors which were related to academic achievement had their influence regardless of the sex or the socio-economic background of the student. Thus teachers and parents can encourage these academic achievement oriented factors without being concerned with targeting specific sex and socio-economic groups.

The second major phenomena found was that there were some factors which were specific to certain sex and socio-economic groups. Teachers and parents will need to be aware of these factors and to be careful to encourage the correct factors for each group. Further these group differences should provide starting points for research and theory building to attempt to understand why these differences exist.

Among the variables important to all students, the parent-child relationships are perhaps the most amenable to action. Schools, church groups, and community groups can provide lectures and films teaching parents that it if important for the mother to accept, love, and value the child. Both parents need to learn to use control mechanisms which are not hostile. Further both parents need to understand the importance to the child of realistic limits on his autonomy and how the child needs a moderate amount of discipline in order not to feel ignored and unloved. Television specials could reach a broad audience teaching good parenting. In the schools such information can be taught to teenagers who are future parents.

Intelligence was the single most important personality trait related to academic performance. Moreover self-concept, especially how intelligent the student felt himself to be was also very important. While the modification of basic intelligence is a complicated matter involving nutrition, early childhood experiences and genetic endowment, self-concepts are more easilty changed. Here is where the bi-lingual problem of Puerto Rican students in the U.S. comes in as many of these students feel themselves stupid when they have difficulty understanding instruction in English.

It is recommended here that the schools routinely monitor how intelligent a child thinks he is. An immediate goal for the teacher of a child with a low self-concept is to increase the student's feeling that he is an intelligent able person. For Puerto Ricans in continental schools, great attention should be paid to their self-concept and where necessary they should be given intensive instruction in English before returning to the classroom to receive their instruction in other subjects in this new language. Any student can have a low self-image. Where stress is given to competitive achievement, only a portion of the children can see themselves as highly intelligent. It is recommended then that stress should be given to what each child can do, measured on an absolute scale, and little emphasis should be given to comparative rankings or grades.

Several personality traits were associated with good school performance. The high achiever tends to be more responsible, more mature, more obedient, more conscientious, and more self-disciplined. It is recommended that schools accept the responsibility of teaching students to exhibit responsible, mature, obedient, conscientious, and self-disciplined behavior. These traits should be measured every year and changes in the trait scores should be explicit educational goals. Alternatively, the schools should create learning climates which do not require such personality traits.

Turning next to those factors which did differ for different sex and socio-economic status groups, girls who were high achievers tended to be less Authoritarian, less Dogmatic, less Test Anxious and lower on Social Desirability scores. This implies that low achieving girls could profit from attention to their rigid and anxious world views. Secondary school social science courses should contain cross-cultural and anthropological elements so designed as to be especially relevant to girls. Test Anxiety should be considered when a girl of adequate intelligence is not performing well academically. Behavior therapy procedures have been successful in dealing with excessive Test Anxiety.

There was an interesting contrast in the personality traits of students whose academic performance was consistent with their socio-economic background compared with those students whose achievement was discrepant with their background. Teachers should be aware that both high achieving students from low SES backgrounds and low achieving students from high SES families are likely to be submissive, bragging, esthetically unaware and sad. These traits imply some amount of psychological strain associated with their discrepant condition. Teachers can help these students especially by attempting to reduce the saliency of the discrepancy. That is, the teacher can work to reduce the importance of family background as a factor in school status systems. Previously the recommendation was also made to reduce the explicit comparisons among students on their academic achievements also.

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APPENDIX A

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APPENDIX A: VARIABLES

Sex and Grade Level:

Sex and grade level of the student was ascertained as part of the identifying data for each questionnaire used in the data collection. For the population, the distribution is shown below:

Sex	Grade Level					
	7	8	9	10	11	12
Male	395	341	206	264	242	184
Female	460	483	392	496	418	377

Junior high school:

Junior high school was defined as grades 7 thru 9.

Senior high school:

Senior high school was defined as grades 10 thru 12.

Academic Achievement:

Academic achievement was measured by the student's grade point average for the 1967-68 academic year. The mean for the population of 1,047 was 2.25. Grades were coded as "1" represents D, "2" represents C, "3" represents B, and "4" represents A. High academic achievers were defined as those who had an "A" or "B" grade point, low academic achievers had "C" or "D" grade point averages.

Socio-economic Status:

Socio-economic status used as a main effect required recoding of the family SES variable. Socio-economic status was recoded into 5 categories, based on the mean and standard deviation of the main variable. The lowest SES category was coded as 1, the highest as 5.

Scores less than $\bar{X}$ - 2 s.d. were coded as "1"

Scores from $\bar{X}$ - 1 s.d. to $\bar{X}$ - 2 s.d. were coded as "2"

Scores from $\bar{X}$ - $\frac{1}{2}$ s.d. to $\bar{X}$ - 1 s.d. were coded as "3"

Scores from $\bar{X} + \frac{1}{2}$ s.d. to $\bar{X} - \frac{1}{2}$ s.d. were coded as "4"

Scores greater than $\bar{X} + \frac{1}{2}$ s.d. were coded as "5" (This truncation of the upper SES categories was necessitated due to the small number of cases falling above $\frac{1}{2}$ s.d.)

Father's Presence in the Home:

Father's presence in home was determined from the following question:

About how many months did your father (or step-father) live at home with you last year?

1. Not at all. He never lived at home.
2. Less than 1 month.
3. About 2 months.
4. About 3 months.
5. About 4 months.
6. About 5 months.
7. About 6 or 7 months.
8. About 8 or 9 months.
9. About 10 or 11 months.
10. All the time (12 months).

As in this study, the father in the home question was converted to a z score, (mean = 8.56, standard deviation = 3.14). This resulted in a z score which, for this variable, had a mean of -0.0007.

Space Index:

The variable, space index was derived from the following question:

How many rooms are in your home? Count only the rooms your family lives in. Count all rooms; bedrooms, bathrooms, kitchen, living room, dining room, recreation room, enclosed porch, etc.

_____	(1) One	_____	(6) Six
_____	(2) Two	_____	(7) Seven
_____	(3) Three	_____	(8) Eight
_____	(4) Four	_____	(9) Nine or Ten
_____	(5) Five	_____	(10) Eleven or more

The space index was obtained by taking the ratio of number of persons in the family divided by the number of rooms available. This ratio was then subtracted from a constant 10, in order to keep all numbers positive with larger numbers indicating more space per person. For example, if a family with five people had five rooms, then the ratio would be 1.0 and when subtracted from 10, the Space Index would be 9.0. Hence families with Space Indexes of greater than 9.0 have more than one room per person, those with Space Indexes of lower than 9.0 have fewer than one room per person. The mean space index for the total population of 3,521 was 8.99, the standard deviation was 0.72.

Number of Children in the Family:

The number of children in the family variable ranged from "one" to "ten or more" and was based on a question asked the student, checked with other questions on number of older and younger brothers and sisters. This question asked the student to include among the children half-brothers and half-sisters and children not living at home as well as those living at home. The question is given below:

> What is the total number of living children in your family? Include yourself, together with all full brothers and sisters, half-brothers and sisters, stepbrothers and sisters, and foster brothers and sisters. Include those that are not living in your home.
>
> _____ (1) One
> _____ (2) Two
> _____ (3) Three
> _____ (4) Four
> _____ (5) Five
> _____ (6) Six
> _____ (7) Seven
> _____ (8) Eight
> _____ (9) Nine
> _____ (10) Ten or more

The mean "family size" of the total population of 3,595 was 5.02 with a standard deviation of 2.61.

Number of Years in the Community:

The number of years in the community variable resulted from the following question:

> How long have your lived in this community?
>
> _____ (1) One year or less
> _____ (2) More than 1 year, but not more than 3 years
> _____ (3) More than 3 years, but not more than 5 years
> _____ (4) More than 5 years, but not more than 10 years
> _____ (5) More than 10 years, but not all my life
> _____ (6) All my life

A high score on this question indicates a greater length of time in the community. More recent immigrants to Bayamon have lower scores. The mean for this variable was 3.94 for 3,503 subjects.

Number of Years Father Attended School:

The number of years father attended school variable resulted from the following question:

Please mark the one answer indicating the highest level of education your father reached. Mark the one best answer even if you are not sure.

_____ (1) None
_____ (2) 1-3 grade
_____ (3) 4-6 grade
_____ (4) 7-8 grade
_____ (5) 9th grade
_____ (6) 10th grade
_____ (7) 11the grade
_____ (8) Graduated from high school
_____ (9) Vocational or business school after high school
_____ (10) Some junior or regular college, but did no graduate
_____ (11) Graduate from a regular 4-year college
_____ (12) Master's degree
_____ (13) Some work toward doctorate or professional degree
_____ (14) Completed doctorate or professional degree
_____ (15) I don't know*

* "I don't know" was coded as missing data.

Number of Years Mother Attended School:

The number of years mother attended school variable resulted from the following question:

Mark the one answer indicating the highest level of education your mother reached. Mark the one best answer even if you are not sure.

_____ (1) None
_____ (2) 1-3 grade
_____ (3) 4-6 grade
_____ (4) 7-8 grade
_____ (5) 9th grade
_____ (6) 10th grade
_____ (7) 11th grade
_____ (8) Graduated from high school
_____ (9) Vocational or business school after high school
_____ (10) Some junior or regular college, but did not graduate
_____ (11) Graduated from a regular 4-year college.
_____ (12) Master's degree
_____ (13) Some work toward doctorate or professional degree
_____ (14) Completed doctorate or professional degree
_____ (15) I don't know*

* "I don't know" was coded as missing data.

Children's Report of Parental Behavior Inventory (CRPBI):

The parent-child relations were measured with a translated and adopted version of Schaefer's (1965) Children's Report of Parental Behavior Inventory. A factor analysis of the scales from this instrument reproduced very closely the three factors which Schaefer had found: Acceptance vs. Rejection; Psychological Control vs. Autonomy; and Firm Discipline vs. Lax Discipline. These factors collectively accounted for 74 per cent of the total variance in both the Mother scales analysis and in the Father scales analysis.

The first factor was termed Acceptance, being composed of scales for Acceptance (Scale 1), Child-Centeredness (Scale 2), Possessiveness (Scale 3), Positive Involvement (Scale 7), Intrusiveness (Scale 8), and Acceptance of Individuation (Scale 13). A second factor, Hostile Psychological Control was composed of the scales of Control through Guilt (Scale 9), Hostile Control (Scale 10), Control through instilling Persistent Anxiety (Scale 15), Control through Withdrawal of Relationship (Scale 17), Rejection (Scale 4), Hostile Detachment (Scale 16), as well as Inconsistent Discipline (Scale 11), Control (Scale 5), and Enforcement (Scale 6). The third factor Autonomy was composed of the scales of Extreme Autonomy (Scale 18), Nonenforcement (Scale 12), and Lax Discipline (Scale 14).

Factor scores were constructed for each student on the foregoing three factors by taking the mean of an individual's scale scores on each of the scales composing the given factor. Each scale entered into one and only one factor score. Thus there were six factors for each student, three describing his mother's behavior and three describing his father's.

The coding procedure for the CRPBI is presented in the following page.

SCORING SHEET FOR THE CHILD'S REPORT OF PARENT BEHAVIOR INVENTORY

Scales	Page 1			Page 2					Page 3				Page 4				TQ
1. Acceptance	1	13	25														
2. Childcenteredness	2	X	26	X		X		X		X		X		X		X	
3. Possessiveness	X	14	X		X		X		X		X		X		X		
4. Rejection	3	15	27														
5. Control	4	X	28	X		X		X		X		X		X		X	
6. Enforcement	X	16	X		X		X		X		X		X		X		
7. Positive involvement	5	17	29														
8. Intrusiveness	6	X	30	X		X		X		X		X		X		X	
9. Control Through Guilt	X	18	X		X		X		X		X		X		X		
10. Hostile Control	7	19	31														
11. Inconsistent Discipline	8	X		X		X		X		X		X		X		X	
12. Nonenforcement	X	20	X		X		X		X		X		X		X		
13. Acceptance of Individuation	9	21															
14. Lax Discipline	10	X		X		X		X		X		X		X		X	

SCORING SHEET FOR THE CHILD'S REPORT OF PARENT BEHAVIOR INVENTORY (Continued)

Scales		Page 1		Page 2		Page 3		Page 4		TO.
15. Instilling Persistent Anxiety	X	22	X	X	X	X	X	X	X	
16. Hostile Detachment	11	23								
17. Withdrawal of Relations	12	X	X	X	X	X	X	X	X	
18. Extreme Autonomy	X	24	X	X	X	X	X	X	X	

TO: = total.

To Score: Assign the value 3 to L, 2 to SL, and 1 to NL, and score in sequential order down the columns.

High School Personality Questionnaire (HSPQ):

In this study the 1968 version of the High School Personality Questionnaire (HSPQ) Form A was used. The instrument was translated and adapted for Puerto Rican use under the direction of Mrs. Ena Vazquez de Nuttall and Mrs. Blanca Ruiz de Rodriguez. The HSPQ was originally developed by Porter and Cattell and the copyright is held by the Institute of Personality and Ability Testing, 1602-04 Coronado Drive, Champaign, Illinois.

This instrument consists of 142 items, all of which are multiple choice with three alternatives. There are 14 scales, each composed of ten items. The time needed for administration averaged 32 minutes in the Junior High Schools and 31 minutes in the High Schools. Thirteen of the scales are measures of personality traits and one, Factor B, measures intelligence. For the thirteen personality scales each item has either the first or the third alternative (c) is indicative of more of the trait then a person gets a score of 0, 1, or 2 on that item depending on whether he answered response a, b, or c. On the other hand if the first answer (a) indicates more of the trait, then the scoring is 2, 1, or 0 for answers a, b, or c respectively. To get a total score for a trait, the number of points a person received on each of the ten items is added up. Thus for these thirteen personality traits the score a person could get ranges from 0 to 20.

For Factor B, Intelligence, the scoring system is somewhat different. Each of the ten items making up this test has one correct answer and two incorrect answers. For example if the middle answer is correct while the a and the c answers are incorrect, the scoring would be 0, 1, 0 for the three answers. In other words, for this factor a person gets a 1 for a correct answer and a 0 for a wrong answer for each of the ten items. Thus the range of scores for the whole scale is from 0 to 10. As can be seen in Table A, this difference in range means that the standard deviation of Factor B, Intelligence, is less than the standard deviations of the other factors.

A description of the factors is given in the next page.

Table A

Factor Names and Descriptions for 14 Factors of the Cattell High School Personality Questionnaire

Factor	Low Score	Factor Name	High Score
A	RESERVED, Detached, Critical, Cool	SOCIABILITY	OUTGOING, Warmhearted, Easygoing, Participating
B	LESS INTELLIGENT, Concrete-Thinking, of lower scholastic mental capacity	INTELLIGENCE	MORE INTELLIGENT, Abstract-Thinking, Bright, of higher scholastic mental capacity
C	AFFECTED BY FEELINGS, Emotionally less stable, Easily upset, Changeable, of lower Ego Strength	EGO-STRENGTH	EMOTIONALLY STABLE, Faces Reality, Calm of higher Ego Strength
D	PHLEGMATIC, Deliberate, Inactive, Stodgy	EXCITABILITY	EXCITABLE, Impatient, Demanding, Overactive
E	OBEDIENT, Mild, Conforming, Submissive	DOMINANCE	ASSERTIVE, Independent, Aggressive, Stubborn, Dominant
F	SOBER, Prudent, Serious, Taciturn	ENTHUSIASM	HAPPY-GO-LUCKY, Gay, Enthusiastic, Impulsive Lively
G	EXPEDIENT, Evades Rules, Feels few obligations, Has weaker Superego Strength	CONSCIENTIOUSNESS	CONSCIENTIOUS Persevering, Staid, Rule-Bound, Has stronger Superego Strength

Table A (Continued)

Factor	Low Score	Factor Name	High Score
H		THICK-SKINNEDNESS	
	SHY, Restrained, Diffident, Timid		VENTURESOME, Socially Bold, Uninhibited, Spontaneous
I		ESTHETIC SENSITIVITY	
	TOUGH-MINDED, Self-Reliant, Realistic, No-Nonsense		TENDER-MINDED, Dependent, Over-Protected, Sensitive
J		INDIVIDUALISTIC	
	VIGOROUS, Goes Readily with the group, Zestful, Given to action		DOUBTING, Obstructive, Individualistic, Internally Restrained, Unwilling to act
O		GUILT-PRONENESS	
	PLACID, Confident, Serene, Untroubled		APPREHENSIVE, Worrying, Depressive, Troubled, Guilt Prone
Q_2		SELF-SUFFICIENCY	
	GROUP-DEPENDENT, A "Joiner" and sound follower		SELF-SUFFICIENT, Prefers own decisions, Resourceful
		WILLPOWER	
Q_3			
	UNDISCIPLINED SELF-CONFLICT, Careless of Protocol, Follows own Urges, has low Integration		CONTROLLED, Socially-Precise, Self-Disciplined, Compulsive, has high self-concept control
Q_4		TENSION	
	RELAXED, Tranquil, Torpid, Unfrustrated		TENSE, Driven, Over-wrought, Frustrated

Peer-Rating Method of Personality Assessment:

Each student is given a list of all of his classmates (in his home-room), each with a two digit number next to his name. He is also given an instrument with 42 pairs of psychological traits. The student is asked to place the numbers corresponding to the names of students he rates as having the given trait in a high amount. He may only select three such students for each trait.

The score for any given person is the number of his classmates who nominate him as high on a given trait. For the multivariate analyses of a later section these pairs of traits are combined and the number of nominations for one trait is subtracted from the nominations for the other trait.

The traits involved are:

1. Adaptable - Rigid
2. Emotional - Calm
3. Conscientious - Cheating
4. Confident - Jealous
5. Quitting - Persevering
6. Tender - Tough
7. Self-Effacing - Bragging
8. Languid - Energetic
9. Assertive - Submissive
10. Attention Seeking - Shy
11. Reserved - Makes Friends Easily
12. Gregarious - Self-Contained
13. Demanding - Patient
14. Quiet - Rowdy
15. Cautious - Adventurous
16. Self-Reliant - Dependent
17. Happy-Go-Lucky - Anxious
18. Responsible - Not Dependable
19. Tense - Relaxed
20. Self-Assertive - Docile
21. Gay - Serious
22. Good-Natured - Spiteful
23. Orderly - Messy
24. Tolerant of Stress - Not Brave
25. Cooperative - Stubborn
26. Mannerly - Crude
27. Easily Upset - Poised
28. Imaginative - Practical
29. Esthetically Sensible - non-esthetic
30. Frank - Inscrutable
31. Talkative - Silent
32. Conforming - Unconventional
33. Considerate - Rude
34. Mature - Immature
35. Original - Unoriginal
36. Resourceful - Uncreative
37. Happy - Sad
38. Curious - Dull
39. Admits Mistakes - Hides Mistakes
40. Prone to Daydream - Wide Awake
41. Obedient - Not Obedient
42. Sociable - Unsociable

California F-Scale

The F-scale used consisted of 28 items from Adorno et al.'s Forms 40 and 45 and one item from Form 78 (Adorno et al. pp. 255-257 and pp. 226-227 respectively). Following Kerlinger and Rokeach (1966) item 22 on Germany in Forms 40 and 45 was dropped as out of date and item 32 from Form 78 was substituted.

Dogmatism Scale:

The Dogmatism Scale was the final 40-item Form E (Rokeach, 1960, pp. 73-80). This scale was scored according to the directions given by the authors.

Text Anxiety:

The measures of Text Anxiety were Sarason's scales for junior and senior high school students (Sarason et al., 1960, pp. 307-308). This scale was scored according to the directions given by the authors.

Social Desirability:

To measure Social Desirability the Children's Social Desirability Questionnaire developed by Crandall, Crandall, and Katkovsky (1965) was used. This scale was scored according to the directions given by the authors.

The Level of Occupation Desired:

The level of occupation desired variable was based upon the following question:

Below is a long list of different occupations in alphabetical order. Please look over it carefully and choose the one single occupation you would most like to make your career after you have completed your education, assuming you could do exactly what you wanted. If your choice is not on the list, choose the one that is closest to it. Choose one of the occupations even if you have not definitely made up your mind.

The list of occupations given in the questionnaire was recoded into 7 classifications as given below:

1. High Prestige Professional

   Government leader (mayor, senator, judge, etc.)
   Physician or Surgeon

2. Professional and Managerial (Med. High Prestige)

   Architect or building designer
   Biological scientist (biologist, botanist, physiologist, zoologist, etc.)
   Dentist
   College professor
   Engineer (civil, mechanical, electrical, aeronautical, chemical)
   Large farm owner or manager
   Lawyer

Manager in business, finance or industry
Mathematician
Pharmacist, optometrist, chiropractor, etc.
Physical scientist (chemist, physicist, geologist, astronomer)
Veterinarian

3. Professional n.e.c.,semi-professional and allied scientific

Armed forces officer
Clergymen (priest, nun, monk, minister, rabbi, etc.)
Draftsman or surveyor
Editor or reporter on a newspaper or magazine
Entertainer, actor, actress
High school teacher
Librarian or library worker
Nurse, physical or occupational therapist
Pilot of airplane
Political scientist or economist
Professional sport player
Social worker or welfare worker
Sociologist or psychologist
Writer
Professional occupation not listed above
Scientific occupation not listed above

4. Technical

Accountant or auditor
Artist, sculptor, designer
Businessman, (owner or proprietor)
Engineering or scientific helper and assistant
Government official or inspector
Medical or dental technician
Musician

5. Skilled

Craftsman
Elementary school teacher
Small farm owner or manager
Office clerk, file clerk, office worker, bookkeeper, bank teller
Policeman, fireman, or other protective workers
Salesman or saleswoman
Secretary or typist
Skilled worker (electrician, plumber, printer, machinist,etc.)
Business occupation not listed above
Technical occupation not listed above

6. Semi-skilled

Barbar, beautician, or similar worker
Enlisted man in the armed forces
Semi-skilled worker (such as factory machine operator, meat-cutter, etc.)
Transportation worker (bus driver, cab driver, chauffeur, railroad worker)
Waiter or waitress

7. Unskilled

Cane worker
On welfare or relief
Ordinary worker or laborer

The mean occupation level wanted was 3.42 for 1047 students.

Level of Occupation Expected:

The level of occupation expected variable was based upon the following question:

Below is the same list of occupations once more. This time please choose the one single occupation you expect you will actually enter after you leave school.

The list of occupations were coded into the same 7 classifications used in the preceding variable.

Degree of Commitment:

The degree of commitment variable was determined by the student's response to the following question:

When do you plan to start college?

_____(0) I plan to start college right after high school.
_____(1) I plan to start college after completing military service.
_____(2) I plan to start college after I have worked for a few years.
_____(3) I may go to college sometime in the future, but my plans are not definite.
_____(4) I don't plan to go to college.

Among the junior high school students 17.5 per cent replied, "4", 51.0 per cent replied "0", 3.2 per cent replied "1", 3.7 per cent replied "2" and 19.6 per cent replied "3". Among the high school students 23.3 per cent replied "4", 52.7 per cent replied "0", 1.4 per cent replied "1", 3.9 per cent replied "2", and 18.0 per cent replied "3".

Degree of Preference for Marriage:

The degree of preference for marriage variable was determined by the student's response to the following question:

Would you prefer to get married rather than go on to college?

1) Yes
2) Don't know
3) No

Self-Rated I.Q.:

The self-rated I.Q. variable resulted from the responses to the following question:

How bright or intelligent do you think you are in comparison with the other students in your grade?

1) Among the brightest
2) Above average
3) Average
4) Below average
5) Among the lowest

Number of Friends in School:

The number of friends in school variable was derived from the following question:

How many of these friends attend this school? _____(0) None

_____(1) One _____(2) Two _____(3) Three _____(4) Four

_____(5) Five

Number of Clubs and Organizations:

The number of clubs and organizations to which a student belonged, other than athletic groups, was derived from the following question:

How many clubs or organizations (other than athletic) have you belonged to in the last 3 years?

_____(1) None
_____(2) One club or organization
_____(3) Two
_____(4) Three
_____(5) Four
_____(6) Five clubs or organizations
_____(7) Six
_____(8) Seven
_____(9) Eight
_____(10) Nine or more

The mean of this variable was 2.03 for 5159 students.

Hours Spent on Homework:

The hours spent on homework variable was derived from the following question:

On the average, how many hours do you study each week? Include study periods in school as well as studying done at home.

_____(1) None
_____(2) About 1-4 hours per week
_____(3) About 5-9 hours per week
_____(4) About 10-14 hours per week
_____(5) About 15-19 hours per week
_____(6) About 20 or more hours per week

The mean for this variable was 2.7336 for 5,223 students.

Attitudes Toward School:

The attitudes toward school variable was derived from the total score on the Tannenbaum Student Attitude Inventory. A low score represented a positive attitude toward school; a high score represented a negative attitude toward school. A sample question from this inventory appears below:

Do you feel that you are going to a good school?

_____A. I am going to a good school
_____B. Most of the time I feel that way
_____C. I cannot make up my mind
_____D. Sometimes I feel that way
_____E. I am not going to a good school.

Degree of Dislike of School:

Degree of dislike of school was determined from the question:

When I leave school and start working, I wish that the place where I work is

_____A. Exactly like school
_____B. Altogether different from school